

Dissertation

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When Does the Sheep Become a Wolf?

Minimal Conditions for Interindividual- Intergroup Discontinuity

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SUMMARY

This dissertation aimed to detect and distinguish between minimal conditions for the interindividual-intergroup discontinuity effect. To date, research has focused on moderators (e.g., Wildschut et al., 2003) and explanations (e.g., Wildschut & Insko, 2007) for the robust phenomenon that intergroup interactions are less cooperative than interindividual interactions. Here, “groups” were mainly treated as aggregates of positively interdependent actors, indicating an interdependence-based perspective of group formation. In bringing together research on interindividual-intergroup discontinuity and social identity theory (Tajfel & Turner, 1979, 1986) it has been reasoned that the effect is also in line with an identity-based perspective of group formation. Furthermore, it has been argued that interdependence-based and identity-based processes were typically confounded in previous research on interindividual-intergroup discontinuity.

The aim of the present thesis was to disentangle the effects of interdependence-based and identity-based group formation on the emergence of the discontinuity effect. It was hypothesized that mere identity-based group formation may be sufficient to decrease actors’ cooperation in mixed-motive situations, and therefore, to account for interindividual-intergroup discontinuity. Moreover, it was hypothesized that part of the classical discontinuity effect may be attributed to identity-based group processes.

Four experiments with real-time interactions and monetary incentives were conducted to test the outlined hypotheses. Using a new experimental paradigm, Studies 1 and 2 manipulated actors’ interdependence (independent vs. interdependent outcomes) and identity salience (personal vs. social identity salience) independent and orthogonal to each other. They provided strong support across two different mixed-motive games (Study 1: ultimatum bargaining game, Study 2: prisoner’s dilemma game) for the hypothesis that identity salience may be sufficient to create interindividual-intergroup discontinuity, whereas outcome interdependence may not. Mediation analyses provided additional support for the proposed identity-based perspective on the discontinuity effect: Social identity salience increased actors’ perceived similarity to own team members relative to opponent team members in the interdependent outcomes condition (Study 2), and increased actors’ perception of all participants as members of two distinct social categories in the independent outcomes condition (Study 3), both predicting defection in the mixed-motive game. Moreover, in line with social identity

theory, the motivation to maximize relative outcomes differences to the opponent(s) mediated the effect of identity salience on mixed-motive game behavior (Study 2). Last but not least, Study 4 showed that intragroup discussions prior to decision-making in the intergroup interaction condition of the classical experimental paradigm on interindividual-intergroup discontinuity might be a possible source of social identity salience. This indicates that identity-based processes might have played an important role for the emergence of previously detected discontinuity effects.

Summing up, this thesis expands hitherto existing knowledge about the minimal conditions that may be sufficient to create the interindividual-intergroup discontinuity effect. I presented an experimental paradigm that is able to distinguish between several structural and psychological factors that have influence on this phenomenon. The results supported the generality of the discontinuity effect: It applies even for mere identity-based groups, irrespective whether group members share an objective common fate (i.e., outcome interdependence) or not. The findings might be used to find alternative ways to reduce the interindividual-intergroup discontinuity effect.

ZUSAMMENFASSUNG

Die vorliegende Dissertation hatte das Ziel minimale Bedingungen für den interindividuellen-intergruppalen Diskontinuitätseffekt aufzudecken und zu unterscheiden. Bisher fokussierte die Forschung darauf, Moderatoren (z.B. Wildschut et al., 2003) und Erklärungen (z.B. Wildschut & Insko, 2007) für das robuste Phänomen zu finden, dass Interaktionen zwischen Gruppen weniger kooperativ sind als Interaktionen zwischen Individuen. Hierbei wurden „Gruppen“ mehrheitlich als Aggregate von positiv interdependenten Akteuren behandelt, welches eine interdependenzbasierte Perspektive der Gruppenformierung zu Grunde legt. Durch Verknüpfung der Forschung zum interindividuellen-intergruppalen Diskontinuitätseffekt und der Theorie der sozialen Identität (Tajfel & Turner, 1979, 1986) wurde geschlussfolgert, dass der Effekt ebenfalls im Einklang mit einer identitätsbasierten Perspektive der Gruppenformierung steht. Darüber hinaus wurde argumentiert, dass interdependenzbasierte und identitätsbasierte Prozesse in der bisherigen Forschung zum Diskontinuitätseffekt typischerweise konfundiert waren.

Ziel der vorliegenden Arbeit war es die Effekte der interdependenzbasierten und identitätsbasierten Gruppenformierung auf die Entstehung des Diskontinuitätseffekts getrennt voneinander zu untersuchen. Es wurde hypothetisiert, dass eine reine identitätsbasierte Gruppenbildung ausreichen kann um die Kooperation von Akteuren in Situationen mit gemischten Motiven zu verringern, und daher den interindividuellen-intergruppalen Diskontinuitätseffekt zu erzeugen. Weiterhin wurde hypothetisiert, dass der klassischerweise aufgedeckte Diskontinuitätseffekt zumindest teilweise auf identitätsbasierte Gruppenprozesse zurückzuführen ist.

Vier Verhaltensexperimente mit Echtzeit-Interaktionen und monetären Anreizen wurden durchgeführt um die ausgeführten Hypothesen zu testen. Unter Verwendung eines neuartigen experimentellen Paradigmas wurde in den Studien 1 und 2 die Interdependenz der Akteure (independent vs. interdependent) und Identitätssalienz (personale vs. soziale Identitätssalienz) unabhängig und orthogonal zueinander manipuliert. Die Studien unterstützen über zwei verschiedene Situationen mit gemischten Motiven (Studie 1: Ultimatum-Spiel, Studie 2: Gefangenendilemma) die Hypothese, dass Identitätssalienz ausreichen kann um interindividuelle-intergruppalen Diskontinuität zu erzeugen. Hingegen war Ergebnisinterdependenz hierfür nicht ausreichend. Mediatoranalysen erbrachten zusätzliche Unterstützung für die

vorgeschlagene identitätsbasierte Perspektive auf den Diskontinuitätseffekt: Soziale Identitätssalienz erhöhte die wahrgenommene Ähnlichkeit der Akteure zu den Mitgliedern des eigenen Interaktionsteams relativ zu den Mitgliedern des gegnerischen Interaktionsteams in der Interdependenzbedingung (Studie 2), und erhöhte die Wahrnehmung der Akteure, dass alle Versuchsteilnehmer zu zwei verschiedenen sozialen Kategorien gehören in der Independenzbedingung (Studie 3). Beides sagte wiederum defektives Verhalten im Spiel mit gemischten Motiven vorher. Darüber hinaus und im Einklang mit der Theorie der sozialen Identität mediierte die Motivation relative Unterschiede zum Gegenspieler zu maximieren den Effekt der Identitätssalienz auf Interaktionsverhalten (Studie 2). Nicht zuletzt zeigte Studie 4, dass Intragruppen-Diskussionen vor der Entscheidungsfindung in der Intergruppeninteraktionsbedingung des klassischen experimentellen Paradigmas zur interindividuellen-intergruppalen Diskontinuität eine mögliche Quelle für soziale Identitätssalienz darstellen können. Dies legt nahe, dass identitätsbasierte Prozesse eine Rolle bei der Entstehung bisher beobachteter Diskontinuitätseffekte gespielt haben könnten.

Zusammenfassend kann gesagt werden, dass die vorliegende Arbeit das bisherige Wissen über minimale Bedingungen, welche ausreichen um den interindividuellen-intergruppalen Diskontinuitätseffekt zu erzeugen, erweitert. Ich habe ein experimentelles Paradigma vorgestellt, welches in der Lage ist zwischen verschiedenen strukturellen und psychologischen Einflüssen auf dieses Phänomen zu unterscheiden. Die Ergebnisse unterstützen die Generalisierbarkeit des Diskontinuitätseffekts: Dieser gilt sogar bei reinen identitätsbasierten Gruppen, unabhängig davon ob die Gruppenmitglieder ein gemeinsames Schicksal (z.B. Ergebnisinterdependenz) teilen oder nicht. Die Ergebnisse könnten genutzt werden um alternative Wege für die Reduzierung des interindividuellen-intergruppalen Diskontinuitätseffekts zu finden.

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1 INTRODUCTION

*“[...] the quality of mob behavior has always required explanation
because of its apparent discontinuity
with the private characters of the individuals involved.”*

Roger Brown (1954, p. 843)

Every day people have to make countless social decisions. Some of them may be the result of deliberate reasoning others may be rather spontaneous. Some of them may affect only the decision-maker others may also have consequences for other persons. Some of them may create a dilemma for decision-makers because they constitute a conflict between the decision-maker's self-interest and other persons' interests. Furthermore, the situation becomes complicated if a decision's outcome is not only determined by one decision-maker but by two or even more decision-makers whose outcomes are mutual interdependent. Research in Economics, Political Science, and Psychology intensively studied social dilemma situations, identifying *when* people decide and *how* and *why*. However, for a very long time it has been ignored that decision-makers are not always individual persons but may also be groups of several persons. For instance, two firms might either cooperate or compete with each other. One manager in each firm or groups of managers who have shared responsibility might take decisions that affect the outcomes of employees of both firms. The structure of conflict between opponents may be exactly the same in both cases but the decision-makers differ: either individuals or groups.

The present work examined the effect of different types of decision-maker on choices in simple two-actor social dilemmas. Particularly, this dissertation contributes to research that investigates behavioral differences between individual actors and groups as decision-makers. Because individuals as well as groups are decision-makers in many real-life conflict situations (e.g., political and economic conflicts), it is important to explore behavioral differences in their decision-making. It is not trivial to explain why individuals and groups differ in their behavioral tendencies in conflict situations. There is plenty of research and theoretical formulations on both interindividual and intergroup relations separately, however, we still poorly understand when and why individual and group decisions differ. The present research contributes to a better understanding of behavioral differences between interindividual and intergroup interactions by investigating its minimal structural and psychological conditions. I offer

both theoretical arguments and empirical evidence that support an identity-based perspective on behavioral differences between interindividual and intergroup interactions. In this chapter I will give an overview about the topic of interest and review previous research before conveying aims and hypotheses of the present research.

1.1 HISTORICAL BACKGROUND

Whether groups differ in their behavior from individuals has been an important question in scholarly pieces of centuries. The discussion can be traced back to the 4th century before Christ, when the Greek philosopher Plato wrote *The Republic*. In this comprehensive Socratic dialogue he proposed that an enlightened individual – the *Philosopher King* – should rule the society as democracy offers the danger to empower irrational mobs (Plato, trans. 2008). Later philosophers and politicians adopted Plato's view and expressed their concerns with regard to the political empowerment of groups, too. For instance, Alexander Hamilton, James Madison, and John Jay noticed that civilized individuals often become hostile and deceitful when banded together in groups. They critically analyzed in the *Federalist Papers*: “In all very numerous assemblies, of whatever character composed, passion never fails to wrest the scepter from reason. Had every Athenian citizen been a Socrates, every Athenian assembly would still have been a mob” (Publius, 1788/1991, No. 55).¹ When group psychology became a topic of scientific treaties in the late 19th and early 20th century, a pioneer of the field, Gustave Le Bon, proposed that groups are prone to act more primitively and destructively than individuals. His main argument was that group members' behavior is disposed by a mental possession of a collective crowd mind. Capturing his analysis in a nutshell, he wrote: “Isolated he may be a cultivated individual; in a crowd, he is a barbarian – that is, a creature acting by instinct.” (1895/1996, p. 13). Later psychologists picked up Le Bon's idea that mental operations and actions of group members may differ essentially from those of isolated individuals (e.g., McDougall, 1920), which has been designated as “the ‘master problem’ of social psychology” (Allport, 1962, p. 7). Nevertheless, this issue became quite late target of systematic experimental investigations. To contrast behavior of groups and individuals one needs a

¹ The *Federalist Papers* is a series of 85 essays and displays the primary source for interpretation of the U.S. constitution. It has been published under the pseudonym *Publius*, in honor of the Roman consul Publius Valerius Publicola (5th century before Christ).

comparable conceptualization of *group behavior* and *individual behavior*. However, individuals cannot engage in the kind of hostile behavior that is shown by groups and with which Le Bon, McDougall and others were concerned, like large-scale violence and wars (Insko & Schopler, 1998; Schopler, Insko, Graetz, & Drigotas, 1991). To compare individuals and groups in the domain of aggression or competition requires the presence of a target. Consequently, an adequate conceptualization to examine this issue is the contrast between *interindividual* and *intergroup* behavior. The following subchapter will give an overview about research methods and findings of investigations that contrasted interindividual and intergroup interactions, describing the so-called *interindividual-intergroup discontinuity effect*.

1.2 INTERINDIVIDUAL-INTERGROUP DISCONTINUITY

*“Once individuals are submerged in a group,
they seem to transform from a Dr. Jekyll to a Mr. Hyde [...]”*

Hein F. M. Lodewijkx (2001, p. 166)

More than two decades of research have compared systematically interindividual and intergroup interactions in the context of *mixed-motive situations*. These interactions are characterized by a situation in which opponents’ interests partially correspond and partially conflict with each other (Schelling, 1960). In other words, actors are faced with a conflict between actions that follow the motives to either selfishly maximize own outcomes (*defect*) or to maximize joint outcomes (*cooperate*) – therefore mixed-motive situations. There are numerous experimental games that capture mixed-motive structures, most prominently the *prisoner’s dilemma game*. To contrast behavior of groups and individuals in mixed-motive situations, opponents are either unitary groups (mostly three-persons groups, 3 : 3) or individuals (1 : 1). In a typical experiment comparing interindividual and intergroup relations, opponents – either individuals or groups – are located in different rooms. Participants receive instructions of rules and examples of a mixed-motive game, typically the prisoner’s dilemma game. After examining the mixed-motive situation, individuals or group representatives meet in a central room to discuss possible actions. Finally, opponents make separate decisions in their homerooms. Groups typically have to reach a joint decision after having a group discussion or a majority rule is applied to achieve a group decision.

Bornstein (2003, 2008) proposed a taxonomy of mixed-motive games by types of decision-makers, distinguishing between separated *individuals*, *unitary (cooperative) teams*, and *non-cooperative groups* (see Table 1).

Table 1. Taxonomy of mixed-motive games by types of decision-makers (adapted from Bornstein, 2003, 2008)

Opponent Player	Nature	Individual (I)	Unitary Team (U)	Non- cooperative Group (G)
Individual (I)	I	I-I	I-U	I-G
Unitary Team (U)	U	U-I	U-U	U-G
Non- cooperative Group (G)	G	G-I	G-U	G-G

Note. Research on interindividual-intergroup discontinuity contrasts I-I interactions with U-U interactions, depicted in gray

Hereafter, individuals are independent decision-makers. For example, the I-I cell represents the literature on two-person games (see e.g., Komorita & Parks, 1995 for an overview). Unitary teams consist of several interdependent individuals that have to reach a binding joint decision. Reaching a joint team decision is costless and there is no conflict of interest between members of the same team. For example, research in the U cell represents the literature on decision-making by (unitary) groups (e.g., Davis, 1992). In contrast, non-cooperative groups are faced with an intragroup conflict among (interdependent) group members. Here, group members make individual decisions, which are then aggregated to a group decision. For example, the G cell represents the literature on non-cooperative n-person games, particularly the public goods literature (see e.g., Ledyard, 1995 for an overview). In the context of research on interindividual-intergroup discontinuity, there is no structural conflict of interests within teams and teams typically reach a joint decision. According to Bornstein's classification, the

behavioral comparison that is made in the experimental setting of interindividual-intergroup discontinuity is that of the I-I cell to the U-U cell.

In one of the first experiments manipulating the type of decision-maker in mixed-motive situations, McCallum and colleagues (1985) found that intergroup interactions (i.e., the U-U cell) were significantly less cooperative than interindividual interactions (i.e., the I-I cell) on both a prisoner's dilemma game matrix and a mutual fate control matrix. Using the metaphor of the title of this dissertation, if actors interact in an interindividual context, they are typically friendly like a sheep. If actors interact in an intergroup context, however, they are typically aggressive like a wolf. An impressive body of research demonstrated the robustness and generalizability of this effect in both laboratory and non-laboratory settings (for reviews see Schopler & Insko, 1992; Schopler et al., 2001; Wildschut & Insko, 2007; Wildschut, Pinter, Vevea, Insko, & Schopler, 2003). Because of this discontinuity between behaviors as a function of type of decision-maker, this phenomenon has been labeled the *interindividual-intergroup discontinuity effect*.² Its robustness and the fact that core elements of mixed-motive games are represented in many situations of everyday life make the discontinuity effect an important field of research in social science. Previous research mainly focused on two questions: First, what is the generality of the effect? And second, what are the underlying psychological mechanisms responsible for the effect? In the following, research aiming to answer these questions is reviewed.

1.2.1 Generality of interindividual-intergroup discontinuity

The interindividual-intergroup discontinuity effect appeared across different situations and samples. Most of the evidence comes from laboratory research in Social Psychology and Behavioral Economics comparing interindividual and intergroup interactions on various mixed-motive situations. The majority of experiments used the prisoner's dilemma game (PDG) or some modification (e.g., PDG-alt, Insko, Kirchner, Pinter, Efaw, & Wildschut, 2005; PDR, Insko et al., 1992), but the effect has also been shown by investigating other mixed-motive games, for instance the *chicken game* (Wolf, Insko, Kirchner, & Wildschut, 2008), the *ultimatum bargaining game* (Bornstein & Yaniv, 1998), the *centipede game* (Bornstein, Kugler, & Ziegelmeyer, 2004), the

² The labels interindividual-intergroup discontinuity effect, interindividual-intergroup discontinuity, and discontinuity effect are used as synonyms for the same phenomenon.

trust game (Kugler, Bornstein, Kocher, & Sutter, 2007), *contest games* (*Tullock's contest*: Abbink, Brandts, Herrmann, & Orzen, 2010; *beauty contest game*: Kocher & Sutter, 2005) and *team games* (*intergroup prisoner's dilemma game* and *intergroup public goods*; Insko et al., 1994). Moreover, the effect has been found when the mixed-motive game was framed as a realistic situation (i.e., exchange of folded origami figures; Schopler et al., 2001) as well as in a non-laboratory diary study (Pemberton, Insko, & Schopler, 1996). Mostly, participants have been North-American, but the effect has also been documented among Dutch (e.g., Wildschut, Lodewijx, & Insko, 2001), Israeli (e.g., Bornstein & Yaniv, 1998), and Japanese participants (Takemura & Yuki, 2007).

A meta-analytic review of 130 comparisons (Wildschut et al., 2003) of interindividual and intergroup interactions in the context of mixed-motive situations (Wildschut et al., 2003) revealed four moderators of the discontinuity effect (ranked according to the meta-analytic effect sizes): (1) opponent strategy, (2) communication between opponents, (3) conflict of interest, and (4) procedural interdependence between group members. Additionally, recent research indicated that (5) actors' guilt proneness might also serve as a moderator variable for interindividual-intergroup discontinuity.

First, the discontinuity effect is larger if the opponent strategy is unconstrained or constrained-cooperative than when it is reciprocal. The majority of discontinuity experiments examined real-time interactions in which the choice of both sides was unconstrained. However, some studies investigated individual and group decisions in relation with programmed opponent behaviors. If the opponent's behavior is (programmed) reciprocal to the actor's choices (e.g., *tit-for-tat* strategy; Axelrod, 1984), actors can maximize long-term outcomes by (mutual) cooperation, whereas they can maximize long-term outcomes if they are faced with a (programmed) constrained-cooperative opponent strategy by responding defectively. Both individuals and groups tended to cooperate with reciprocal opponents and the discontinuity effect shrunk or even disappeared, which is in line with the notion of long-term outcome maximization (Insko et al., 1998, 2001). Opponent strategy is closely related to another structural characteristic of the interaction situation, namely whether there is a one-shot interaction or an iterated (repeated) interaction. A reciprocal opponent strategy may be only effective if the actor anticipates a future interaction with the same opponent. In line with this assumption, the discontinuity effect was reduced when actors expected multiple

interaction trials compared to a single trial (Schopler et al., 2001), and when actors were explicitly requested to consider future consequences of their choices (Wolf et al., 2009).

Second, many studies on interindividual-intergroup discontinuity allowed for communication between opponents prior to decision-making (interindividual or intergroup discussion respectively). The meta-analysis by Wildschut and colleagues (2003) showed that the effect is larger if this communication is unconstrained relative to constrained cooperative communication, for instance via confederates' cooperative intent through written hand notes or telephone (e.g., Lodewijkx, Wildschut, Syroit, Visser, & Rabbie, 1999). Individual opponents may "benefit" more from communication than opposing groups (e.g., by increasing trust among opponents), intensifying the behavioral difference between both interaction conditions. However, if communication is rather indirect and constrained (e.g., communication via chat), trust building among individual actors may be less effective, leading to a decreased discontinuity effect by means of decreased interindividual cooperation (see e.g., Brosig, Weimann, & Ockenfels, 2003; Wichman, 1970 on the role of different kinds of communication and trust building)

Third, the discontinuity effect theoretically applies to all mixed-motive situations with a *value of correspondence* that ranges from zero down to, but not including -1.00 (Schopler et al., 2001; Wolf et al., 2008). Correspondence of outcomes is the correlation of opponents' outcomes, indicating how variations of one actor's outcomes can be related to changes in the other actor's outcomes (Kelley & Thibaut, 1978; Thibaut & Kelley, 1959). Therefore, it is an index of conflict of interest. If opponents' outcomes are positively related, there is in fact no conflict of interest and both individual and group actors should cooperate to maximize personal and joint outcomes. Supporting this assumption, there was no discontinuity effect found for the *battle of the sexes* matrix, which has a strong positive level of correspondence (i.e., $r = .80$; Wolf et al., 2008). In the case of perfect noncorrespondence of outcomes ($r = -1.00$), the game turns into a zero-sum situation. Here, no choice can involve cooperative intent because there is no one choice that benefits both players. Therefore, one would not expect behavioral differences between interindividual and intergroup interactions, and in turn, no discontinuity effect.

Fourth, interindividual-intergroup discontinuity is larger in situations with an interrelationship of group members' personal decisions and joint group's outcomes, which has been called procedural interdependence (Insko et al., 1994; Wildschut et al.,

2001). Procedural interdependence may be characterized by a required consensus to reach a group decision (often through an intragroup discussion) or (positive) interdependence of group members' outcomes.

Finally, recent studies have shown that particularly actors high in dispositional guilt proneness are those who defect in intergroup interactions (T. R. Cohen, Montoya, & Insko, 2006; Insko et al., 2005; Pinter et al., 2007). It has been argued that high-guilt-prone group members adhere to group morality by an increased concern to maximize the ingroup's relative standing to an outgroup, compared to low-guilt-prone group members (see also *two moralities paradox*, Wildschut & Insko, 2006).

In sum, there is evidence for a descriptively large discontinuity effect when the opponent strategy is unconstrained or constrained-cooperative, when there is the possibility for unconstrained communication between opponents, when the index of correspondence is negative (i.e., noncorrespondence of outcomes), when group members are procedural interdependent, and when actors' guilt proneness is high. Although these moderators may establish some understanding on the emergence of the interindividual-intergroup discontinuity, however, at the best they provide indirect evidence for the underlying psychological mechanisms that might account for the effect. Therefore, the next section summarizes explanations that have been offered to account for the interindividual-intergroup discontinuity effect.

1.2.2 Explanations of interindividual-intergroup discontinuity

Research has offered several explanations why intergroup relations are less cooperative than interindividual relations. Wildschut and Insko (2007) distinguished between two general perspectives of explanations for the interindividual-intergroup discontinuity effect: the *fear and greed perspective* and the *group decision-making perspective*. In the following, these general perspectives of explanations are summarized and each explanation for interindividual-intergroup discontinuity is shortly described.

The fear and greed perspective encompasses a family of different explanations that assume greater fear of receiving the lowest possible outcome or greater greed associated with receiving the highest possible outcome in intergroup interactions compared to interindividual interactions. Fear can relate either to losing rewards per se (absolute) or to losing the competition with the opponent(s) (relative). Greed can also

operate in absolute or relative terms. In interdependence theory (Kelley & Thibaut, 1978), the motivation to maximize absolute outcomes has been labeled *max own* and the motivation to maximize relative outcomes *max rel*, respectively.³ The different explanations comprised in this perspective are: (1) schema-based distrust, (2) identifiability, (3) social support, (4) ingroup-favoring norm, and (5) altruistic rationalization.

First, it has been shown that there may be more fear involved in intergroup interactions relative to interindividual interactions because the anticipation of an interaction with another group activates negative cognitive and affective responses, perceiving other groups as untrustworthy and hostile (*schema-based distrust or fear explanation*; e.g., Wildschut, Insko, & Pinter, 2004). This is the only explanation that centers on the greater fear in intergroup relative to interindividual relations. Moreover, interacting groups may also be greedier than interacting individuals for several reasons. For instance, second, actors are less identifiable for their defective behavior in an anonymous intergroup context, which provides a “shield of anonymity” allowing group members to avoid personal responsibility for a defective choice (*identifiability explanation*; Schopler, Insko, Drigotas, & Wieselquist, 1995). Third, members of the same group may provide mutual social support for self-interested behavior. Social support by ingroup members for pursuing a self-interested strategy can reduce normative constraints of fairness and equality (*social support for shared self-interest explanation*; e.g., Wildschut, Insko, & L. Gaertner, 2002). Fourth, group membership might imply normative pressure to act in favor of the ingroup. This may be another source of defective intergroup behavior that stands in contrast to fairness and equality (*ingroup-favoring norm explanation*; e.g., Wildschut et al., 2002). Finally, group members may rationalize their defective behavior as being in the interest of their own group (*altruistic rationalization explanation*; Insko, Pinkley, Hoyle, et al., 1987).

³ Defective behavior in mixed-motive situations may be motivated either by *max own* or by *max rel* (or by both). In the discontinuity effect literature defective behavior is often denoted as *competition*, irrespective of its underlying motivation. However, from an economical perspective there exists a clear distinction between selfish behavior and competitive behavior (e.g., Fehr & Fischbacher, 2002). Whereas the former one is exclusively motivated by material self-interest, the latter one takes also other-regarding social preferences into account (i.e., spiteful or envious preferences). In the following, therefore, non-cooperative behavior in mixed-motive situations is denoted as *defection* in general, and as *competition* in particular if it is motivated by *max rel*.

In contrast to the fear and greed perspective, the group decision-making perspective encompasses explanations that share the assumption that the intragroup discussion prior to decision-making facilitates rational comprehension of the mixed-motive situation, and that this rational insight might play an important role in producing the discontinuity effect. The four perspectives comprised in this perspective are: (1) backward induction, (2) group polarization, (3) reciprocity, and (4) cautious reciprocation. First, it is in the nature of mixed-motive situations that “rational” actors, who are purely self-interested (maximizing their own absolute outcomes), should always defect. The logic of backward induction, which is the process of reasoning backwards in time, dictates non-cooperative behavior even in sequential interactions, as rational actors would anticipate the actions of equally self-interested opponents (Von Neumann & Morgenstern, 1944). However, the complex structure of mixed-motive games makes it difficult to identify the rational solution. Due to intragroup discussion, group members are less prone to making mistakes in finding the rational solution than are individual decision-makers because they can pool their cognitive resources, leading to an increased discontinuity effect (*backward induction explanation*; e.g., Bornstein et al., 2004). Second, the intragroup discussion may also strengthen individuals’ dominant behavioral inclination, for instance by exchange of persuasive arguments (*group polarization explanation*; Meier & Hinsz, 2004). Third, it has been argued that because of group members’ superior comprehension of the game structure through intragroup discussion, they are more likely to reciprocate the cooperative or defective behavior of the opponents in an attempt to maximize long-term outcomes (*reciprocity explanation*; e.g., Rabbie, 1998). Finally, the reciprocity explanation has been embedded in a broader theoretical framework, arguing that group members’ (rational) strategy to reciprocate opponents’ actions might only work properly if the opponents’ actions are predictable. Otherwise, intergroup interactions might be rather defective than interindividual interactions as the mechanisms assumed by the fear and greed perspective are at work (*cautious reciprocation explanation*; e.g., Lodewijckx, Rabbie, & Visser, 2006).

1.2.3 Status quo

Interindividual-intergroup discontinuity is an important and robust phenomenon. As it has turned out, the explanation of interindividual-intergroup discontinuity is anything but simple. Even though the effect itself is straightforward, the overview

shows that there is no shortage of explanations why intergroup relations are less cooperative than interindividual relations. Wildschut and Insko (2007) concluded that “the fear and greed perspective was found to be more consistent with the empirical record than a group decision-making perspective” (p. 203).

One reason for the conclusion is that some studies have found a significant discontinuity effect even in the absence of intragroup discussions prior to intergroup interaction (Pinter et al., 2007; Wildschut, Insko, & Pinter, 2007). This raises doubts that the processes assumed by the group decision-making perspective are necessary to produce the discontinuity effect, however, it does not mean that intragroup discussion might not enhance intergroup defection.

Another reason is that the fear and greed perspective is very consistent with the identified moderators of interindividual-intergroup discontinuity: opponent strategy, communication between opponents, conflict of interest, procedural interdependence between group members, and dispositional guilt proneness. Reciprocal opponent strategies always respond to cooperation in kind, which reduces distrust and fear, as well as the fact that defection begets a defective opponent response weakens or removes greed. Communication between opponents may be less credible and persuasive for group actors than for individual actors because intergroup relations involve more distrust/fear. And even when the communication of cooperative intent is perceived as credible, anonymity and social support for shared self-interest should make groups more likely to exploit the opponent than individuals. If the conflict of interest between opponents increases through a negative index of correspondence, the advantages of mutual cooperation decline and both fear and greed should increase. Procedural interdependence provides anonymity for group members and may easily activate schema-based distrust among opponents. Last but not least, guilt proneness motivates conformity to moral norms and concerns for close others (Baumeister, Stillwell, & Heatherton, 1994). If an intergroup conflict is salient, actors high in guilt proneness should be inclined to follow a greedy ingroup-favoring norm. In sum, explanations for the interindividual-intergroup discontinuity effect comprised by the fear and greed perspective have not only good empirical evidence but also are consistent with known moderators of the effect.

In the literature on interindividual-intergroup discontinuity, differences between individuals and groups are predominantly characterized by structural differences of the interaction situation, treating actors either as independent or as interdependent (mostly

procedurally interdependent). However, research on group processes and intergroup relations has offered several perspectives of individual vs. group behavior. The following section introduces these different approaches of group formation.

1.3 TWO PERSPECTIVES OF GROUP FORMATION

To fully understand interindividual-intergroup discontinuity it is necessary to understand what actually characterizes intergroup interactions in contrast to interindividual interactions. However, this characterization starts with the obstacle of diverse definitions of the concept *group*. There are two approaches of group formation that can be distinguished: the *interdependence-based* and the *identity-based* group formation approach (Wilder & Simon, 1998).

As Campbell (1958) already pointed out, to define what actually is and what is not a social group is not a trivial task. Whereas the evaluation of most non-organic and biological objects to entities is based on “hard” physical criteria (e.g., shape, weight, color), social aggregates are fuzzier and less discrete. *Entitativity* is the extent to which a group is perceived as being a coherent unit in which the group members are bonded together in some fashion (e.g., Brewer & Harasty, 1996; Campbell, 1958). It is therefore an index for perceived “groupness”. According to Campbell (1958), entitativity of social aggregates has “to be diagnosed or confirmed by common fate *and* similarity coefficients among responses” (Campbell, 1958, p. 24; italics added). Other authors highlighted the importance of only one of both factors for the perception of social groups – common fate *or* similarity. Some researchers have seen groups as social entities with a character of mutual influence. For instance, Lewin (1948) has argued “it is not similarity or dissimilarity of individuals that constitutes a group, but rather the interdependence of fate” (Lewin, 1948, p. 165). According to this interdependence-based approach, the fact that individuals “are in the same boat” (Rupert Brown, 1988, p. 28) makes them a group. In contrast, according to the identity-based approach of group formation, groups are seen as cognitive and affective representations of social entities. An aggregate of individuals becomes a social group if at least two individuals define themselves as members of a group and when its existence is recognized by others (e.g., Tajfel, 1981; Tajfel & Turner, 1979). A central characteristic of these group representations is that perceived similarities between members of the same group exceed perceived similarities between members of different groups (*meta-contrast*

ratio; e.g., Campbell, 1958; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). According to this perspective, group members have a salient social identity whereas individuals have a salient personal identity. Both approaches – the interdependence-based and the identity-based perspective – imply that behavior shown by individuals might be interpreted as an expression of intergroup behavior if the actors either share a common fate with other individuals (interdependence-based approach; e.g., Lewin, 1948), or if they self-categorize as members of different social groups and their social identities become salient (identity-based approach; e.g., Tajfel & Turner, 1979; Turner et al., 1987). Imagine for instance a peace treaty negotiation of two politicians who represent the interests of different countries. This interaction could be viewed as intergroup interaction – albeit there are individual opponents – because they share the outcomes with the citizens of their country (interdependence-based view; either they live altogether in peace or carry on suffering from war) and due to the definition of themselves and the recognition by others as citizens of different countries (identity-based view). As it becomes clear in this example, interdependence of fate and salience of a social identity often occur together. However, it is also obvious that they represent different structural characteristics of groupness. In fact, research by Lickel and colleagues (e.g., Lickel, Hamilton, & Sherman, 2001; Lickel et al., 2000) indicates that group entitativity may be composed by different group properties and that these properties result in several clusters of group types: intimacy groups (e.g., family, friends), task groups (e.g., work team, jury), social categories (e.g., women, Blacks), and loose associations (e.g., people in a line at a bank). However, as noted by Lickel, Hamilton, and Sherman (2001) there is lack of research on differing behavioral tendencies with regard to how group entitativity is formed:

[...] relatively little research has examined the way in which intragroup and intergroup phenomena are influenced by the type of groups that is involved. For example, consider the issue of intergroup conflict. [...] However, we are aware of no research that has systematically investigated the extent to which conflict between groups occurs because of the same reasons, or through the same process, when the two groups that are engaged in the conflict are of a distinct type. (p. 137)

The present work aims at closing this gap by investigating intergroup interactions either between interdependent actors (interdependence-based group formation), between similar actors with regard to a social category (identity-based

group formation), or both, compared to interindividual interactions (independent actors with a salient personal identity) in mixed-motive situations. The following section presents research questions and hypotheses of the present research.

1.4 THE PRESENT RESEARCH

What is the unique role of actors' interdependence and actors' social identity salience for the interindividual-intergroup discontinuity effect? Or put it in another way: Is it group members' interdependence of fate, their salience of social identity, or both that makes them less cooperative than individual actors in the context of mixed motive situations? Previous research disregarded the distinctive value of interdependence- and identity-based group formation for the emergence of interindividual-intergroup discontinuity. The classical comparison involves a one-factorial contrast between interindividual (1 : 1) and intergroup (3 : 3) interactions. On the one hand, actors in the intergroup interaction condition share a common fate by reaching a joint decision and sharing its outcomes (e.g., Wildschut et al., 2001). This may be a source of interdependence-based entitativity in intergroup interactions. On the other hand, intragroup and intergroup discussions strengthen actors representation and identification as a group member (e.g., Bornstein, Mingelgrin, & Rutte, 1996; Dawes, McTavish, & Shaklee, 1977; Sally, 1995). This may be a source of identity-based entitativity in intergroup interactions. Clearly, intergroup interactions in the classical discontinuity effect paradigm involve group members who are interdependent *and* have a salient social identity. The aim of the present work is to investigate the role of both types of group formation – which have been confounded in previous studies – for interindividual-intergroup discontinuity independently and orthogonally. With this approach it is possible to answer whether the discontinuity effect is rather a function of actors' interdependence (independent vs. interdependent), actors' identity (personal vs. social), or both. Therefore, with regard to the present research, the classical one-factorial, interindividual-versus-intergroup interaction distinction transforms to a two-factorial, independent-versus-interdependent actors and personal-versus-social identity distinction (see Table 2).

Table 2. Two-factorial distinction of the interindividual-intergroup discontinuity effect

Identity-based group formation approach	Interdependence-based group formation approach	
	Independent actors	Interdependent actors
Personal identity	<i>Independent actors with personal identity salience</i>	<i>Interdependent actors with personal identity salience</i>
Social identity	<i>Independent actors with social identity salience</i>	<i>Interdependent actors with social identity salience</i>

Note. The classical one-factorial, interindividual-versus-intergroup interaction distinction is nested in the two-factorial distinction, depicted in gray

Below I elaborate the state of knowledge regarding differences in mixed-motive game behavior as a function of actors' independence vs. interdependence, and actors' salient personal vs. social identity.

1.4.1 Actors' independence vs. interdependence

The central characteristic of group members' interdependence is that they share some kind of common fate. This interrelationship of group members' personal decisions has two components: a required consensus to reach a joint group decision and a positive interdependence between group members' outcomes (both representing procedural interdependence, see Insko et al., 1994; Wildschut et al., 2001, 2003). A consensus rule is typically applied through a majority decision rule. For instance, if two group members vote for defection and one group member votes for cooperation, a majority decision rule would yield a defective group decision. If the interaction is structurally symmetric and both opponent sides have to reach a single decision, a consensus rule also implies a single outcome shared by all members of the same group. Therefore, a consensus rule always entails outcome interdependence between group members but not vice versa. Outcome interdependence between group members is the positive correlation of their earnings. In the domain of interindividual-intergroup discontinuity, outcome interdependence between group members is maximal positively correlated ($r = 1.00$), resulting in a common fate of group members. In contrast, outcomes between opponents are negatively correlated ($0 > r > -1.00$), creating a conflict of interest (e.g., Wolf et al., 2008).

From the fear and greed perspective on interindividual-intergroup discontinuity (Wildschut & Insko, 2007) both components – required consensus and outcome interdependence – might be sources of actors' decreased cooperativeness, creating interindividual-intergroup discontinuity. One may argue that actors who have to reach a joint decision are less identifiable (e.g., Schopler et al., 1995). If actors jointly follow a greedy strategy, opponents cannot attribute personal responsibility to only one individual actor. In turn, this shield of anonymity through a group consensus rule may be easily anticipated by opponents and activates schema-based distrust (e.g., Wildschut et al., 2004). Furthermore, even merely outcome interdependent actors who make individual decisions that are not “condensed” to a joint group decision might be less cooperative than outcome independent actors because their common fate activates an ingroup-favoring norm (e.g., Wildschut et al., 2002). If the own decision affects the decision-maker's own outcome as well as the ingroup members' outcomes, defection can be attributed to the maximization of the group's absolute or relative earnings and not only to the maximization of actors' own absolute or relative earnings. This might create normative pressure to decide in the ingroup's interest (i.e., to defect). In sum, both components of procedural interdependence – required consensus to reach a joint group decision and mere interdependence of group members' outcomes – might be sufficient to produce a behavioral difference between independent and interdependent actors, and therefore account for the moderating role of procedural interdependence on the interindividual-intergroup discontinuity effect (Wildschut et al., 2003).

Little research examined either explicitly or implicitly whether actors' interdependence might be a necessary prerequisite for the discontinuity effect. On the one hand, there are findings suggesting that a positive interdependence between actors decreases their cooperativeness in interaction with another group of interdependent actors relatively to independent opponents, but only if group members had to reach a joint decision and not when they were just merely outcome interdependent (Insko, Pinkley, Harring, et al., 1987; Insko et al., 1988). On the other hand, it has been found that even in the absence of a consensus rule outcome interdependent group members were less cooperative in *n*-person generalizations of the prisoner's dilemma game (intergroup prisoner's dilemma and intergroup public goods; Insko et al., 1994), or when outcome interdependent group members knew the decision-makers' choice (*accountable leader*; Pinter et al., 2007).

Altogether, there are theoretical arguments why actors' independence vs. interdependence in mixed-motive situations might be a source of interindividual-intergroup discontinuity. However, empirical findings whether mere outcome interdependence is sufficient to decrease actors' cooperativeness, or whether it requires in addition a consensus among actors are mixed. Moreover, most of these studies involved the possibility for intragroup and intergroup discussions, and instructions differed considerably between conditions regarding the framing of the interaction and its opponents as *individuals* or *groups*. Therefore, it is difficult to conclude from previous research that interdependence itself is sufficient to account for interindividual-intergroup discontinuity because processes of identity salience as proposed by the identity-based perspective of group formation might also – at least partially – account for previous findings. The next section deals with these identity processes and explicates how they might play a role for the emergence of the discontinuity effect.

1.4.2 Personal vs. social identity salience

The idea that social identity processes might be an important factor to understand interindividual-intergroup discontinuity is based on experimental findings by Henri Tajfel and colleagues that stimulated research on intergroup relations and led to the formulations of social identity theory (SIT; Tajfel & Turner, 1979, 1986) and self-categorization theory (SCT; Turner et al., 1987). Whereas SIT exposes motivational aspects of intergroup behavior, SCT mainly focuses on cognitive mechanisms of intragroup processes.⁴

According to the social identity perspective of group formation and intergroup behavior (e.g., Hogg, Abrams, Otten, & Hinkle, 2004; Hornsey, 2008), a person's self-concept encompasses a *personal identity* and a *social identity*. A person's personal identity is based on idiosyncratic characteristics that are not shared with other people – a self-construal in terms of the distinction *I* and *You*. Social identity derives from a person's representation as a group member and the subjective meaning associated with this knowledge. People of the same social group identify themselves in the same way,

⁴ There are several variations and extensions to the classical perspective of SIT and SCT (e.g., optimal distinctiveness theory, Brewer, 1991; intergroup emotions theory, Mackie & Smith, 1998). However, these theoretical developments share the basic ideas of an identity-based group formation. As this review aims to give a general overview of this perspective of group formation and its implications for interindividual-intergroup discontinuity, they are not detailed here.

have the same definition of what attributes they share, and how they relate to and differ from other groups.⁵ People cognitively represent groups in terms of prototypes. These prototypes are fuzzy sets of interrelated attributes that capture similarities within groups and differences between groups according to the principle of meta-contrast. From a social identity perspective, group membership is a collective self-construal in terms of the distinction *We* and *They*. In a given situation only one identity is psychologically real – the salient basis of self-construal and social perception (e.g., Oakes & Turner, 1986).

One of the main statements of the social identity approach is that people with a salient social identity are prone to favor their own group over outgroups (*ingroup bias*). As proposed by SIT, people strive for a positive distinctiveness – a positive image of their own group relative to other groups. This hypothesis rests on the assumption that self-enhancement and self-esteem is one of the most basic human motives (see Sedikides & Strube, 1997 for a detailed argumentation). Ingroup-favoring behavior may therefore be in the pursuit of bolstering self-identity through the relative advantage for the own group. However, the self-esteem hypothesis within SIT is one of the most controversial parts of the theory (for an overview see Rupert Brown, 2000). It has been questioned whether ingroup-favoring behavior is merely based on people's motivation to boost their self-esteem. Hogg (2000) proposed an alternative explanation for ingroup bias, arguing that people identify with and act in favor of their own group just to reduce personal uncertainty about their social world and their place within it. Accordingly, the achievement of certainty about oneself and one's social environment is a basic human motive and the behavior in accordance with the interest of one's own groups fulfills this need.

There is a considerable amount of experimental research supporting the identity-based view of group formation and its proposed consequences. It has been shown that the creation of groups on the basis of ostensible differences (*minimal group paradigm*; e.g., responses to an irrelevant preference or judgmental task) is enough to make peoples' social identity salient and produce an ingroup bias (e.g., allocation of more points to an unknown ingroup member than to an unknown outgroup member; for reviews see Brewer, 1979; Diehl, 1990). In fact, there was some evidence that participants gave absolutely less points to either group if it allowed them to positively

⁵ According to SCT, there is also a third level of categorization: the superordinate category of the self as a human being, often labeled as *human identity* or *collective identity*.

maximize the relative difference of their ingroup to the outgroup (max rel instead of max own). Using the terms of Messick and Sentis (1985), under conditions of social identity salience the *social utility* (i.e., payment for ingroup member relative to outgroup member) becomes more relevant than *nonsocial utility* (i.e., absolute payment for ingroup member). Importantly, this ingroup bias has been reported to occur even in the absence of (objective) interdependence between group members, providing evidence that mere categorization can account for intergroup competition (e.g., Billig & Tajfel, 1973; Tajfel, Billig, Bundy, & Flament, 1971). To summarize this perspective of group formation and its evidence with the words of Hornsey (2008): “The group identity not only describes what it is to be a group member, but also prescribes what kinds of attitudes, emotions and behaviours are appropriate in a given context.” (p. 209).

But how does actors’ identity salience relate to the interindividual-intergroup discontinuity effect? It seems plausible to assume that actors in the classical interindividual interaction condition have a salient personal identity, as this condition involves an interaction of two unique persons (*I* vs. *You*). In the classical intergroup interaction condition, however, actors should have a salient social identity, constituted by a salient categorical distinction and strengthened by intragroup discussion (Sally, 1995; Samuelson & Watrous-Rodriguez, 2010), the presence and conflict of interest with a competing outgroup (e.g., Bornstein, 1992; Bornstein & Ben-Yossef, 1994), but also due to their common fate with other ingroup members (e.g., Turner & Bourhis, 1996),⁶ all leading to a self-construed distinction of *We* vs. *They*. Research has shown that persons’ concern to act in the interest of a group in mixed-motive situations increases if actors categorize themselves as members of the same group (e.g., De Cremer, Van Knippenberg, Van Dijk, & Van Leeuwen, 2008), especially if the ingroup’s welfare corresponds to individual’s welfare (Wit & Kerr, 2002). If there is a conflict of interest between the own group and another group – as in the discontinuity effect paradigm – acting in the interest of one’s own group means defecting in interaction with the opponent group. In sum, first, one may agree that there might be a difference in identity salience between the interindividual (salient personal identity) and intergroup interaction condition (salient social identity) of the typical experimental

⁶ Perceptions of interdependence or common fate are of importance in group behavior, but can be seen as part of a wider social identity mechanism. People may use information such as interdependence to construct social categories. Perceived interdependence may therefore be both a possible cause and effect of psychological group formation (entitativity) through social identity salience (see also Turner, 1999).

design observing the discontinuity effect. Second, according to the identity-based perspective of intergroup behavior, actors with a salient social identity are motivated to positively maximize the difference relative to outgroup opponents. Therefore, they are rather prone to compete than to cooperate in interaction with outgroup members. However, from this one cannot imply that actors with a salient social identity defect *more* than actors with a salient personal identity, leading to interindividual-intergroup discontinuity. Some authors have argued that both individual actors and group members should receive positive bolstering of self-esteem from doing better than the opponent(s), and should therefore also be equally defective (Drigotas, Insko, & Schopler, 1998; Insko & Schopler, 1987; Insko et al., 1992). In their view, “[t]he theory is not so much implausible as incomplete” (Drigotas et al., 1998, p. 182) to explain interindividual-intergroup discontinuity. However, as stated earlier, it might not be the motivation to bolster self-esteem but rather the motivation to reduce subjective uncertainty of the social situation that leads to an ingroup bias (e.g., Hogg, 2000). In other words, an uncertain environment as present in mixed-motive situations (e.g., regarding outcomes, other persons’ choices and the adequate own choice) might motivate ingroup-favoring behavior of persons with a salient social identity, leading to intergroup defection. In contrast, subjective uncertainty among persons with a salient personal identity has been shown to strengthen norms of fairness and equality, leading to interindividual cooperation (for reviews see Van Dijk & De Cremer, 2006; Van Dijk, Wit, Wilke, & de Kwaadsteniet, 2010). Clearly, to expect behavioral differences between people with a salient personal vs. social identity does not require the self-esteem hypothesis within SIT.

There is also indirect evidence from the literature on interindividual-intergroup discontinuity that identity salience might play an important role for the emergence of the effect. Mediation analyses have shown that distrust, the motivation to maximize absolute outcomes (max own), *and* the motivation to maximize relative outcomes (max rel) may serve as mediators for the discontinuity effect (e.g., Insko et al., 2005; Pinter et al., 2007; Wildschut et al., 2001, 2002). According to the identity-based perspective, max rel should particularly account for intergroup defection. Furthermore, not all of the proposed explanations summarized by the fear and greed perspective on interindividual-intergroup discontinuity require factual interdependence between group members, but may also predict a behavioral difference between actors with a salient personal vs. social identity: the schema-based distrust or fear explanation, the ingroup-favoring

norm explanation, and the altruistic rationalization explanation (see subchapter 1.2.2). The mechanisms proposed by these explanations may be triggered merely by actors' differences in identity salience. I should also mention one study that investigated the role of actors' social categorization on the discontinuity effect (Insko et al., 2005, Study 2). Here, participants were assigned either to an interindividual (1 : 1) or intergroup interaction (3 : 3) condition like in previous research. However, opponents were not assigned randomly but according to a minimal group procedure (preference for paintings from the artists Klee vs. Kandinsky; see also Tajfel et al., 1971). Participants interacted either with an ingroup opponent (same artist preference) or with an outgroup opponent (different artist preference) on a PDG-alt matrix, which offers a discrete choice between three alternatives: cooperation, withdrawal, and defection.⁷ It was found that cooperation was greater between individuals than between groups, as well as between ingroup opponents than between outgroup opponents. However, looking only on defection, there was a significant interaction type \times opponent type interaction, indicating that groups defected more than individuals, particularly with ingroup rather than outgroup opponents. The effects on cooperation are in line with the interdependence-based and identity-based perspective on interindividual-intergroup discontinuity. The interaction effect on defection is somewhat puzzling. The authors interpreted this finding as a tendency of groups to exploit the expectation that opponents' will cooperate. However, there are two reasons why I think that this study does not help to uncover the mere effects of actors' interdependence and identity salience on interindividual-intergroup discontinuity. First, as opponents in all conditions were assigned according to the minimal group procedure, the study did not manipulate personal vs. social identity salience but rather ingroup vs. outgroup interactions under social identity salience. Second, the interaction situation in the intergroup interaction/ingroup opponent condition was framed as an intergroup interaction, and this might have been further strengthened by team members' positive interdependence and intragroup discussions prior to decision-making. Therefore, the tendency for groups to defect more in interaction with ingroup opponents compared to individual actors might be attributed to a subgrouping process (e.g., Richards & Hewstone, 2001), which

⁷ Withdrawal is a "safe" option that provides a payoff, which is lower than the payoff for mutual cooperation as well as the payoff for sole defection, but higher than the payoff for sole cooperation as well as the payoff for mutual defection. It has been argued that actors should choose this option if they are fearful regarding the opponent choice (e.g., Schopler, Insko, Drigotas, & Graetz, 1993).

could have undermined the originally implemented social categorization. Although these findings are interesting and provide a first step in the direction this dissertation is heading for, it cannot disentangle the independent effects of interdependence and identity salience on the interindividual-intergroup discontinuity effect.

1.4.3 Summary

Previous research on the interindividual-intergroup discontinuity effect treated groups as aggregates of interdependent actors. However, the classical experimental paradigm leaves also room for the interpretation that actors identity salience accounts (to some extent) for the effect. I presented different theoretical arguments as well as empirical evidence that suggest that both an interdependence-based as well as an identity-based group formation may be independently sufficient to produce interindividual-intergroup discontinuity. However, as both factors have been inherently confounded in most of previous research, it is not possible to give an answer whether actors' independence vs. interdependence and actors' salient personal vs. social identity are by themselves sufficient minimal conditions to create the discontinuity effect, or whether it is a joint function of both mechanisms.

The following empirical studies aimed to provide a new experimental paradigm that allows disentangling both mechanisms and exploring their independent role for interindividual-intergroup discontinuity.

2. EMPIRICAL EVIDENCE

2.1 STUDY 1

The aim of the present study was to manipulate actors' interdependence and identity salience orthogonally to each other, investigating their independent effects on the emergence of interindividual-intergroup discontinuity.

As stated earlier, actors' interdependence has two components: mere outcome interdependence and a consensus rule, the former one typically nested in the latter. To reiterate, the main interest of this thesis was to detect *minimal* conditions sufficient for a discontinuity effect. Thus, interdependence was manipulated by means of actors' mere outcome interdependence. Participants were either assigned to teams of three actors that played against each other, with common outcomes for all actors of a team (3 : 3; outcome interdependence) or, in contrast, individual actors played against one another (1 : 1; outcome independence).

To make actors' social identity salient, individuals have to identify with a group that has some value for them (e.g., Tajfel, 1981). Therefore, social identity was made salient by means of a minimal group paradigm. Participants completed a judgment task, assessing their over- or underestimation of a shortly presented varying number of objects (e.g., Tajfel, 1970; Tajfel et al., 1971). According to the results of this task, opponents from opposing social groups were matched (overestimators : underestimators; independent and interdependent outcomes condition), whereas interdependent team members were from the same social group (all either over- or underestimators; only interdependent outcomes condition). Interactions and opponents were framed as *intergroup interactions* and *groups* respectively, irrespective of the outcome interdependence condition. In contrast, personal identity was made salient by making all kinds of assignments (opponents and interdependent actors) randomly. There was no reference to a group/intergroup context within the instructions to avoid a spontaneous activation of social identity, rather interactions and opponents were framed as *interindividual interactions* and *individuals* respectively.

As both factors (outcome interdependence and identity salience) were manipulated independently of each other, there were four possible combinations: Outcome interdependence with social identity salience (3 : 3; actors were informed that their team consists of members of the same social group and the opponent team of

members of the opposing social group), outcome interdependence with personal identity salience (3 : 3; no reference to social group membership), outcome independence with social identity salience (1 : 1; actors were informed that their opponent is from the opposing social group), outcome independence with personal identity salience (1 : 1; no reference to social group membership).

In order to prevent that a social identity emerged spontaneously between the actors of a team in the 3 : 3 condition, there was no intergroup discussions or contact between them (all actors remained seated individually at their computers during the experiment). Assignment of actors to teams and groups as well as opponent matching was completely anonymous to ensure that nobody knew who their team members or opponents were.

In the following, I derive hypotheses regarding the differences in actors' mixed-motive game behavior between the four combinations of outcome interdependence and identity salience that were realized in the present experimental design.

2.1.1 Hypotheses

The combination of outcome interdependence with social identity salience (3 : 3, team and opponent matching according to social group memberships) is similar to the intergroup interaction condition of a classical discontinuity paradigm (see subchapter 1.4.2 for a detailed argumentation). In this condition, actors share a common fate and represent themselves and the other outcome interdependent individuals as members of the same social group. In contrast, the combination of independent outcomes with salient personal identity (1 : 1, random matching) corresponds to the interindividual interaction condition of a classical discontinuity paradigm – actors have to decide on their own and are affected only personally by the outcomes of the game. Thus, in line with previous research (e.g., Brewer & Kramer, 1986; Insko et al., 2005) I hypothesized that interactions between (social) groups of outcome interdependent actors with a salient social identity are less cooperative than interactions between outcome independent individuals with a salient personal identity, replicating the standard discontinuity effect. I predicted that this difference should obtain even in the absence of discussions between members of a group with outcome interdependent actors sharing a salient social identity (see also Pinter et al., 2007, Study 2).

Comparing the 3 : 3 condition (interdependent outcomes) with the 1 : 1 condition (independent outcomes) yields a test for the “pure” effect of outcome interdependence. As reviewed earlier, although one may theoretically argue that actors’ mere outcome interdependence might be sufficient to decrease their cooperativeness in mixed-motive interactions, only a few studies have found a significant discontinuity effect under conditions of group members’ mere outcome interdependence (Insko et al., 1994; Pinter et al., 2007; see subchapter 1.4.1 for a detailed description). However, the specific conditions of these studies were not realized in the current experiment (Insko et al., 1994: domain of n -person games; Pinter et al., 2007: outcome interdependent group members knew the choice of the decision-maker). Therefore, I assumed that mere outcome interdependence of actors alone would not be sufficient to decrease actors’ cooperativeness compared to interactions between actors who are outcome independent (see also Insko, Pinkley, Harring, et al., 1987; Insko et al., 1988).

A comparison between the condition in which actors’ social identity was made salient by means of minimal group assignments (salient social identity) and the condition with random assignments (salient personal identity) allows testing the mere influence of identity salience on behavior in mixed-motive situations. As stated earlier, the identity-based perspective on group formation proposes that actors’ salient social identity is sufficient to motivate actors competitively maximizing the gain of their ingroup relative to the outgroups’ gain, even in the absence of interdependence between ingroup members (see subchapter 1.4.2 for a detailed argumentation).

Thus, I predicted that actors’ salient social identity suffices to decrease cooperation with outgroup opponents compared to interactions between actors with a salient personal identity.

2.1.2 Method

Participants and experimental design

Participants were 98 students (53 men, 45 women) from various disciplines of the University of Jena. Age of participants ranged from 18 to 33 years ($MD = 22$). All participants received a show-up fee of 2.50 € and had the possibility to earn additionally up to 6 € (overall earnings of $M = 5.50$ €). I used a 2 (outcome interdependence: independent vs. interdependent) \times 2 (identity salience: personal vs. social identity)

between-subjects design. Participants were randomly assigned to one of the conditions. Respective cell sample sizes were 26 in the independent outcomes/social identity condition and 24 in each of the other three conditions.

Procedure

Participants subscribed via the online registration software ORSEE (Greiner, 2004) for the experimental sessions, each consisting of 10 to 14 participants. Experimental sessions were run in a laboratory with separated individual PCs. On arrival, participants drew an index card to determine their cubicle number. The whole experiment was computer-mediated using the software z-Tree (Fischbacher, 2007) without actual contact between participants. Before the experiment started, the experimenter told participants that they would have real interactions with other participants via the computer without any form of communication prior to decision-making, and that these interactions would determine their payoffs. In the social identity condition the experiment started with an adapted minimal group paradigm. Here, participants estimated in five trials the number of objects (“X”) that were presented on the screen (5 to 30 objects per screen, in each trial presented for 500ms). According to participants’ judgments, they were assigned either to the group of *overestimators* or *underestimators*, followed by four questions regarding their identification with the respective group.⁸ Subsequently, instructions provided detailed information about the *interactive decision-making task* (the words *game*, *cooperation* or *competition* were not used in the instructions). Participants received examples and had to pass several control questions before the experiment started in order to make sure that they understood the structure of the decision-making task properly. Next, participants in the independent outcomes condition were told that they would interact with another participant, who would be either randomly selected (personal identity condition) or who would be a member of the other social group regarding the results of the judgment task (social

⁸ The laboratory belongs to the School of Economics and Business Administration, which allows no deception procedures in experiments. In fact, the test measured over- or underestimation of participants’ judgments. Participants were assigned accordingly to the respective group. However, there were only five trials, which rendered the test unreliable but still face valid, leading in fact to a random group assignment. To make sure that half of the participants were assigned to each group, the software computed a median-split of participants’ mean estimations in each session. There were no differences between the groups regarding group identification and mixed-motive game-behavior in all experiments.

identity condition; overestimator : underestimator). Participants in the interdependent outcomes condition were told about the interaction of two teams of three outcome interdependent actors each. Participants were either assigned randomly to the teams (personal identity condition) or according to their social group memberships (social identity condition; members of the own team were drawn from the same social group, and members of the other team were drawn from the other social group). In the interdependent outcomes condition it was further explained that team members would make their decisions individually and independently; however, one member of each team would be selected randomly and the decision would be paired with the decision of a randomly selected member of the other team. The payoffs resulting from this pairing would apply to *all* members of the respective team. Thus, the game was played 3 : 3 in the interdependent outcomes condition, with members of the same team having a common fate by being outcome interdependent (all members got the same payoff), whereas all participants in the independent outcomes condition (1 : 1) made decisions that only affected their personal and the opponent's outcomes. Participants then made their decisions. Afterwards, they completed a short post-experimental questionnaire that assessed demographics. Finally, participants were informed about their payoff. Participants were separately called, paid, and dismissed by the experimenter. The whole experiment took about 20 to 30 minutes.

Dependent variables

Behavior in an UG. We used a one-shot ultimatum bargaining or ultimatum game (UG), which allows a continuous assessment of the actors' tendency to cooperate or defect (see Güth, Schmittberger, & Schwarze, 1982 for a first experimental analysis). The main reason for using the UG was based on the continuous measurement of cooperative and defective behavioral tendencies, which might be more sensitive to small motivational differences compared to binary-choice matrix games like the prisoner's dilemma game (Simpson, 2006). The UG involves two players: the proposer or allocator, and the responder or recipient. They receive a sum of monetary units by the experimenter (i.e., 100 ECUs, corresponding to a value of 6 €). Then, the proposer has to split the sum by proposing to take share x , so that the recipient receives $100 - x$. If the recipient accepts the proposed division, both players get paid accordingly. However, if the recipient rejects the proposal, both players get paid nothing. Figure 1 illustrates the

extensive-form representation of an UG with two possible proposals (node 1), one that might be considered as a “fair” offer (F; $100 - x = 50$), and one that might be considered as an “unfair” offer (U; $100 - x = 20$). The recipient (node 2) may either accept (A) the offer, which would result in the respective distribution (50/50 or 80/20 respectively), or reject (R) the offer, which would result in an outcome of 0 for both proposer and recipient.

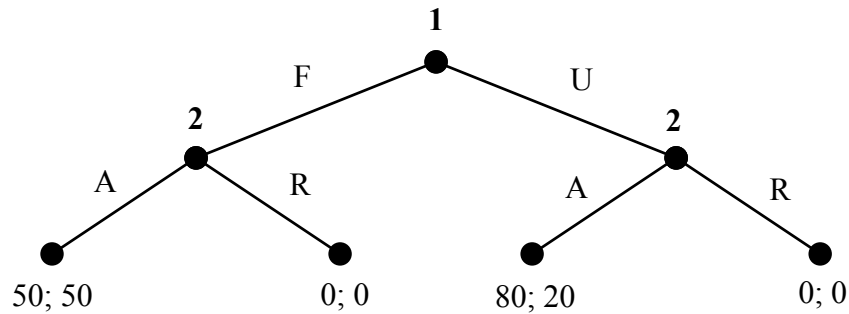


Figure 1. Extensive-form representation of a two proposal ultimatum game; The proposer (1) may either offer a fair (F) or unfair (U) amount to the recipient (2), who in turn can either accept (A) or reject (R) the proposal. Amounts of fair and unfair offers are

Assuming that both players are individually “rational”, concerned only with maximizing their own absolute payoffs, the *subgame perfect Nash equilibrium* would predict that the recipient accepts every proposal for which either $x < 100$ or $x \leq 100$, because 1 ECU is better than nothing, and even an offer of 0 ECU makes the recipient indifferent between accepting and rejecting the offer.⁹ Anticipating that, it would be individually rational for the proposer to offer either the smallest positive amount to the recipient ($x = 99$, $100 - x = 1$), or nothing. Proposing a small amount is generally interpreted as defective behavior (either selfish or competitive, or both), whereas proposing a large amount can be seen as cooperative behavior. Rejecting small offers

⁹ Indifference is a common term in game theory that relates to a set of options with the same utility. In the present example, with regard to own outcomes, it does not make a difference whether the recipient accepts or rejects an offer of $100 - x = 0$, as both would lead to an outcome of 0. It is often assumed that decisions are made randomly if decision-makers are indifferent regarding possible options. However, one may also argue that in the state of indifference social preferences become salient and actors are prone to make equitable decisions (i.e., to reject the offer). However, this discussion goes beyond the scope of the present work.

($100 - x \leq 50$) can be taken as an indicator of competitive (although “irrational”) behavior as only offers with $100 - x > 50$ increase the positive outcome difference relative to the opponent, whereas accepting all possible offers increases the actor’s absolute outcome and can be interpreted as selfish behavior (e.g., Bornstein & Yaniv, 1998). Clearly, the UG displays a mixed-motive situation that causes an internal conflict for the decision-maker.

To increase the statistical test power, the UG was played using the strategy vector method (Selten, 1967): All participants first made their decision for a proposal, and then they decided on the minimum amount they would accept as recipient. The roles were assigned randomly at the end of the experiment (participants were informed about this procedure beforehand). Previous studies did not find significant behavioral differences when using this method with regard to choice behavior (e.g., Brandts & Charness, 2000; Güth, Huck, & Müller, 2001; Oxoby & McLeish, 2004).

In contrast to the game-theoretic solution for individual (absolute) profit-maximization, it has been found that individuals playing the UG tend to offer a sizeable amount (on average 40-50% of the sum) and proposals that fall below a certain limit get consistently rejected. These findings are robust across different populations and experimental procedures (for an overview see Camerer & Thaler, 1995). It has been suggested that these findings could be explained by a utility of fairness and the exigency to punish unfair offers (Ochs & Roth, 1989).

To my knowledge, there is only one published paper that used the UG to compare interindividual and intergroup interactions. Bornstein and Yaniv (1998) found in two experiments a discontinuity effect for proposer decisions: Groups proposed significantly less to other groups than individuals did to other individuals. However, with regard to the recipient decisions, groups did not differ from individuals. Because proposing small amounts and accepting small amounts is in line with an economic perspective of absolute outcome maximization, the authors interpreted these findings in favor of the backward induction explanation (see subchapter 1.2.2). They have argued that group members become more rational actors than individuals through group discussions.

Group identification. Participants in the social identity condition answered four items regarding their identification with the ingroup (either overestimators or underestimators according to the judgment task) using items by Doosje, Ellemers, and Spears (1995), for

instance “I feel attached to other students in the basic/advanced study period.” Participants answered the items on 7-point-scales, with 1 = *strongly disagree* to 7 = *strongly agree* (Cronbach’s $\alpha = .61$).

Analytic strategy

In contrast to most of previous research on interindividual-intergroup discontinuity where groups had to reach a joint decision, in the present study participants in all conditions made their decisions independently without communicating with the opponent(s) and/or the members of their own team. Therefore, the unit of analyses was the individual.

2.1.3 Results

Descriptive statistics

The overall proposals ranged from 1 to 65 ECUs ($MD = 37$, $M = 36.00$, $SD = 10.65$), minimum acceptance thresholds ranged from 0 to 50 EMUs ($MD = 25$, $M = 22.96$, $SD = 13.22$), which is comparable to previous findings (e.g., Camerer & Thaler, 1995).¹⁰ Proposals and minimum acceptance thresholds were positively correlated ($r = .44$, $p < .001$), indicating that participants, who made smaller proposals, were also willing to accept smaller proposals.

Participants in the social identity condition showed a medium level of identification with the group they were assigned to (overestimators or underestimators; $M = 3.49$, $SD = 1.07$), indicating that the social category had some value for them and therefore, a successful manipulation of social identity salience.

Behavior in the UG by experimental condition

Mean values and standard deviations of proposer and recipient decision for each experimental condition are displayed in Table 3.

¹⁰ Three participants were excluded from the analyses because they stated that they already knew the UG from lectures or previous experiments at the end of the experiment.

Table 3. Mean values and standard deviations of UG-behavior by experimental condition

UG role	Interdependent outcomes		Independent outcomes	
	Social identity	Personal identity	Social identity	Personal identity
Proposer	32.39 (9.40)	37.77 (11.55)	34.04 (11.20)	39.96 (9.19)
Recipient	21.04 (12.12)	25.18 (13.75)	22.00 (13.29)	23.79 (14.10)

Note. Standard deviations in brackets

In a first step, I investigated whether the standard discontinuity effect could be replicated with the present experimental design. Therefore, the planned contrast between the effect-coded interdependent outcomes/social identity condition (coded -1) and the independent outcomes/personal identity condition (coded 1) was computed, separately for proposer and recipient decisions (the remaining conditions were not included in the analysis). As expected, smaller offers were made by participants who acted in outcome interdependent teams with a salient social identity ($M = 32.39$, $SD = 9.40$) than by participants who acted outcome independent with a salient personal identity ($M = 39.96$, $SD = 9.19$); $F(1, 46) = 7.79$, $p = .008$, $\eta_p^2 = .15$. The finding indicates a significant discontinuity effect for proposer decisions. However, the two conditions did not differ regarding the recipient decisions, $F(1, 46) < 1$.

To assess the separate and joint effects of outcome interdependence and identity salience on ultimatum game behavior, I conducted two 2 (outcome interdependence) \times 2 (identity salience) analyses of variance (ANOVA), one for proposer decisions and one for recipient decisions. A significant main effect of identity salience on proposer decisions revealed that participants in the social identity condition ($M_{\text{social}} = 33.27$, $SD = 10.32$) proposed smaller amounts than participants in the personal identity condition ($M_{\text{personal}} = 38.91$, $SD = 10.33$); $F(1, 94) = 7.00$, $p = .010$, $\eta_p^2 = .07$. Neither the effect of outcome interdependence ($M_{\text{interdependent}} = 35.02$, $SD = 10.74$; $M_{\text{independent}} = 36.88$, $SD = 10.61$), nor the outcome interdependence \times identity salience interaction reached significance, both $F(1, 94) < 1$. As hypothesized, the discontinuity effect for proposer decisions mainly reflects the influence of identity salience rather than of outcome

interdependence. An ANOVA with recipient decisions as dependent variable revealed no significant effects, all $F(1, 94) < 1.5, p > .25$.

2.1.4 Discussion

Findings of Study 1 were in line with the prediction that social identity salience is sufficient to produce the discontinuity effect. Participants with a salient social identity who interacted outcome interdependently with two other ingroup members against three outcome interdependent outgroup members were less cooperative (i.e., made smaller proposals to the other group) than outcome independent participants with a salient personal identity who interacted with a randomly assigned opponent. Thus, I replicated the discontinuity effect in the absence of intragroup and intergroup discussions. In addition, no consensus was required to reach a group decision. Therefore, the present study provides further evidence for the robustness and generalization of the interindividual-intergroup discontinuity effect.

Whereas mere salience of social identity was sufficient to decrease cooperation in interaction with outgroup members, actors' positive outcome interdependence alone did not yield a decrease in cooperation. The latter null-effect is in line with previous studies (Insko, Pinkley, Harring, et al., 1987; Insko et al., 1988). The result is remarkable because both factors are inherently confounded in the classical discontinuity paradigm. Thus far, it has sometimes been doubted that social categorization alone is sufficient to create interindividual-intergroup discontinuity (Drigotas et al., 1998; Insko & Schopler, 1987; Schopler & Insko, 1992). However, the findings of Study 1 provide first evidence for the reduction of the interindividual-intergroup discontinuity effect to a mere effect of identity salience by controlling for outcome interdependence and excluding alternative mechanisms. For instance, differences in decision-making procedures of experimental conditions (e.g., intragroup or intergroup discussions prior to decision-making or decision-making by consensus only in intergroup interactions) that were typically present in previous experiments, cannot account for behavioral differences in the present study.

The discontinuity effect was obtained only in the proposer decisions but there was no significant difference among experimental conditions in the recipient decisions, replicating Bornstein and Yaniv's (1998) finding. However, as there was no intragroup discussion prior to decision-making in the present experiment, the backward induction

explanation cannot account for this difference. A possible reason might be a reduced sensitivity of recipient decisions for differences between actors with a salient social and personal identity: Individual's motivation to maximize one's own absolute gain and the motivation to maximize the relative gain of one's own group compared to the gains of the other group come into conflict here. According to social identity theory, social identity salience mainly affects actors' motivation to maximize relative gains. As Tajfel and Turner (1979) wrote:

There is also a good deal of evidence that, within the pattern of responding in terms of in-group favoritism, maximum difference (M.D.) is more important to the subjects than maximum in-group profit (M.I.P.). Thus, they seem to be competing with the out-group, rather than following a strategy of simple economic gain for members of the in-group. (p. 39)

In former studies using the minimal group paradigm, decision-makers self-interest was explicitly excluded. In the present case, however, the motivation of not accepting a disadvantage of one's own group (activating a tendency to reject "unfair" offers, see also Ochs & Roth, 1989) might be overridden by the decision-makers interest of earning as much money as possible, irrespective of what the actors of the other group get. By contrast, in the proposer decisions the motivation to increase the relative advantage of one's group may easily influence decisions because it is compatible with self-interest (Wit & Kerr, 2002). Another possible explanation for the reduced sensitivity of the recipient decisions is that these decisions were always given *after* the proposer decisions had been made. Due to the positive correlation between the two decisions, making a competitive decision as a proposer might have negatively influenced the competitiveness of a subsequent recipient decision, thus counteracting the influence of our independent variables on recipient decisions. In any case, the current findings raise some doubts regarding the backward induction explanation, favored by Bornstein and Yaniv (1998).

A concern regarding the results of Study 1 may be that the encountered effects might partly be based on the continuous property of cooperation and competition as measured in the ultimatum game. One may question whether the effects replicate if participants are faced with a decision *either* to cooperate *or* to compete. It has been argued that such a binary-choice between cooperation and competition provides a more stringent test of behavioral tendencies than a continuous measure (Simpson, 2006). Moreover, previous research on the interindividual-intergroup discontinuity effect

primarily investigated mixed-motive situations with a binary-choice of cooperation/competition (mostly the PDG). Second, Study 1 did not contain a comparison of identity salience between the personal and social identity conditions as a check of the manipulation (in addition to the absolute measure of group identification that was applicable in the social identity condition only). Third, the test power of Study 1 to detect a medium sized effect ($f = .25$; J. Cohen, 1988) was relatively small ($1 - \beta = .67$),¹¹ Therefore, it seemed advisable to replicate the null-effects of outcome interdependence and outcome interdependence \times identity salience in a second study before definite conclusions regarding the influence of this factor on behavior in mixed-motive situations can be drawn.

2.2 STUDY 2

To test the generalizability of the first study's results across different mixed-motive situations, I measured cooperative and defective behavior with a qualitative binary decision in a prisoner's dilemma game (PDG; *either* to cooperate *or* to defect) in the present experiment. Earlier experiments found significant interindividual-intergroup discontinuity effects with various PDG-matrices (e.g., Insko et al., 1988, 2001, 2005; McCallum et al., 1985; Wildschut et al., 2001, 2002). However, in the PDG the two motivations for a defective choice – to maximize absolute and relative gain – are confounded, as they are confounded in the proposer decision of the UG. Therefore, to get a deeper insight into participants' underlying motivation to cooperate or defect, I assessed several motivations that might affect mixed-motive game behavior via closed-ended questions in a post-experimental questionnaire: maximization of absolute gain, maximization of relative gain, minimization of differences, maximization of joint outcomes, and distrust (see e.g., Kelley & Thibaut, 1978). Previous research demonstrated the importance of those motivations in predicting mixed-motive game behavior (e.g., Insko et al., 2005; Wildschut et al., 2001, 2002).

Moreover, as a manipulation-check of the social identity manipulation, I also assessed the perceived similarity/dissimilarity to members of the own team and the opponent team in the interdependent outcomes condition. Following the meta-contrast principle, persons with a salient social identity should perceive greater similarities to

¹¹ Post hoc power calculations were conducted with the program G*Power 3 (Faul, Erdfelder, Buchner, & Lang, 2009).

members of their own team than to members of the opponent team compared to persons with a salient personal identity (e.g., Oakes & Turner, 1986; Turner et al., 1987).

2.2.1 Hypotheses

The aim was to replicate findings of Study 1 – (standard) discontinuity effect through a planned contrast between the interdependent outcomes/social identity condition and the independent outcomes/personal identity condition, and a main effect of identity salience – with a different, binary-choice mixed-motive situation. In addition, in line with the fear and greed perspective (Wildschut & Insko, 2007), I expected that persons' lower willingness to cooperate in the social identity condition compared to the personal identity condition would be mediated by intensified greed and/or fear. More specifically, following social identity theory (Tajfel & Turner, 1979, 1986), a salient social identity should particularly increase actors' motivation to maximize the outcomes of their ingroup *relative* to the outcomes of the outgroup. Furthermore, I hypothesized that actors' perceived relative similarity should account for motivational and behavioral differences between the personal and social identity condition.

2.2.2 Method

Participants and experimental design

Participants were 170 students (65 men, 105 women) from various disciplines of the University of Jena. Age of participants ranged from 18 to 29 years ($MD = 20$). All participants had the possibility to earn up to 7 € (overall earnings of $M = 4.00$ €). The experiment used a 2 (outcome interdependence: independent vs. interdependent) \times 2 (identity salience: personal vs. social identity) between-subjects design. Participants were randomly assigned to one of the conditions. Respective cell sample sizes were 24 in the interdependent outcomes/social identity condition, 36 in the interdependent outcomes/personal identity condition, 54 in the independent outcomes/social identity condition, and 56 in the independent outcomes/personal identity condition (with 12-18

participants per experimental session).¹²

Procedure

The procedure and manipulations of outcome interdependence and identity salience were the same as in Study 1. Because of the extension of the post-experimental questionnaire, the experiment took slightly longer (about 30 to 40 minutes).

Dependent variables

Behavior in a PDG. Participants played a one-shot prisoner's dilemma game (PDG). This mixed-motive situation involves symmetric interactions between two opponents (individuals or teams). It was first framed as a 2×2 outcome matrix by Merrill Flood and Melvin Dresher in 1950 as part of RAND corporation's studies on global nuclear conflict, later formalized by mathematician Albert W. Tucker with an anecdote about prisoners (Poundstone, 1993). In the PDG, each side can choose between C (cooperation, labeled X in the experiment) and D (defection, labeled Y), without knowing the choice of the opponent(s). The outcome for the two sides is determined by the combination of their respective choices. Following the game theoretic analysis of this game, it is "rational" for both sides to defect, because C is strictly dominated by D: $u(C, C) < u(D, C)$ and $u(C, D) < u(D, D)$, yet, cooperation is collectively more efficient: $u(C, C) > u(D, D)$ and $u(C, C) > [u(C, D) + u(D, C)]/2$. Therefore, by defecting actors maximize both absolute and relative gain. Figure 2A displays the normal-form representation of a formalized PDG matrix with its payoffs: *reward* (R) for mutual cooperation, *punishment* (P) for mutual defection, *temptation* (T) for defecting alone, and *sucker* (S) for cooperating alone (with absolute values $T > R > P > S$).

There are several versions of matrices with a varying proportion of payoff T and S that fulfill the mathematical criteria of a PDG. By varying this relation, the noncorrespondence of outcomes – an index of opponents' conflict of interest – may

¹² The relative frequency of participants in each condition is roughly proportional to standard errors in the conditions. After collecting data with approximately equal sample sizes per condition (24-36 participants), standard errors of the mean difference for the identity salience manipulation were $SE = 0.26$ for the interdependent outcomes condition and $SE = 0.51$ for the independent outcomes condition. Therefore, I recollected data in the independent outcomes condition to have a roughly equal standard error of the mean difference in the latter condition ($SE = 0.19$).

differ (Kelley & Thibaut, 1978; Thibaut & Kelley, 1959; see also subchapter 1.2.1). To avoid a floor effect or ceiling effect in actors' behavioral tendencies as a function of the experimental condition, two PDG matrices with an index of correspondence of $r = -.80$ and $r = -.88$ were pretested (see Figure 2B and 2C).

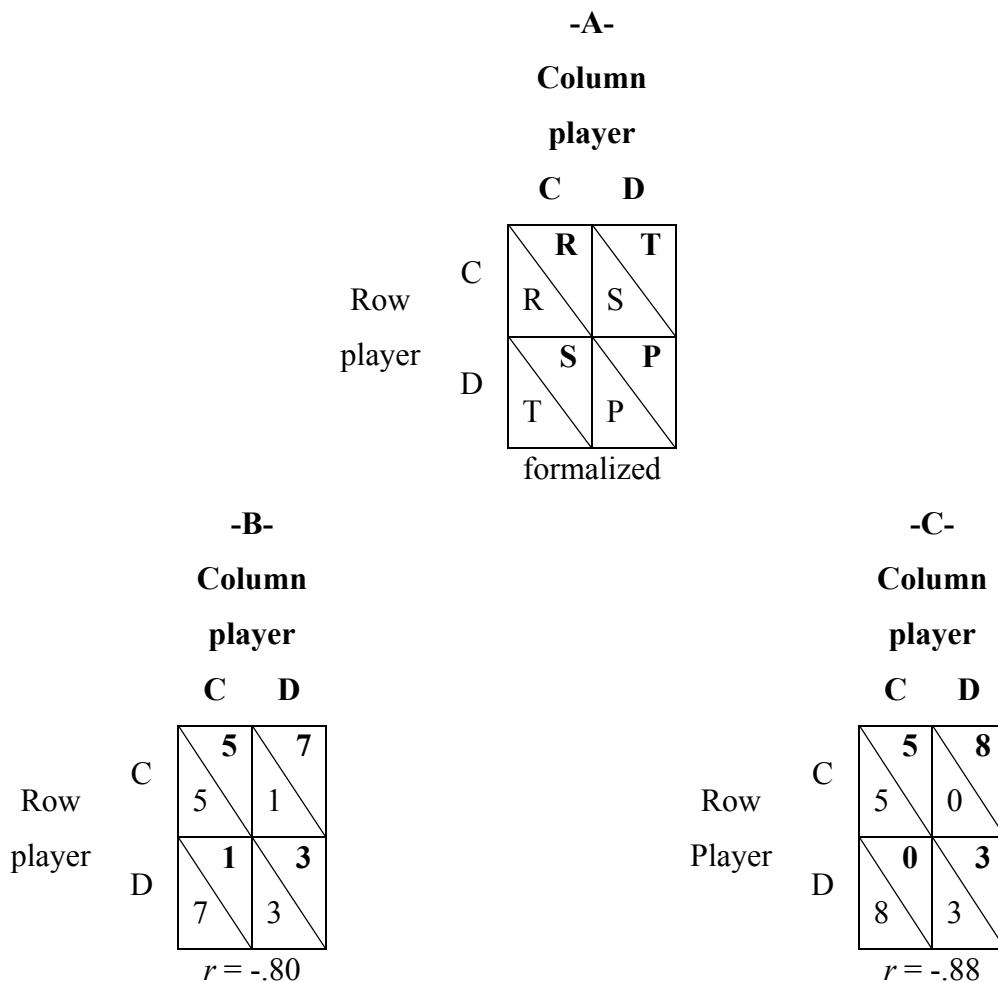


Figure 2. Normal-form representation of PDG matrices; A: formalized with payoffs reward (R), punishment (P), temptation (T), and sucker (S); B: with an index of correspondence of $r = -.80$; C: with an index of correspondence of $r = -.88$

Group identification. As in Study 1, participants in the social identity condition answered four items regarding their identification with the group of overestimators or underestimators respectively (Doosje et al., 1995; Cronbach's $\alpha = .81$).

Reasons for PDG-choice. After participants made their choice in the PDG, they were asked for reasons of that choice. They indicated the degree of agreement/disagreement

with 10 statements (1 = *completely disagree* to 7 = *completely agree*), each two assessing one of the following motivations: maximization of the own (group's) absolute outcome (*max own*; "[...] to earn as much as possible, independently of what the other player/group earns." and "[...] to earn as much as possible, I did not think so much about what the other player/group earns."), maximization of the relative outcome difference (*max rel*; e.g., "[...] to earn more than the other person/group." and "[...] more concerned to maximize the difference to the other player/[group] than to maximize my/my group's absolute outcome."), minimization of the relative outcome difference (*min diff*; e.g., "[...] to earn the same amount." and "[...] earnings are fair distributed between me/my group and the other player/group."), maximization of the joint outcomes (*max joint*; e.g., "[...] earn as much as possible together." and "[...] we both/both groups maximize the joint outcome."), and distrust (*distrust*; e.g., "[...] afraid the other player/group could be egoistic." and "I did not trust the other player/group." Spearman-Brown corrected reliabilities of the strategy-categories were: $r_{SB} = .83$ for *max own*, $r_{SB} = .61$ for *max rel*, $r_{SB} = .89$ for *min diff*, $r_{SB} = .85$ for *max joint*, and $r_{SB} = .75$ for *distrust*. Given the satisfactory intraclass correlations, the item-ratings for each category were averaged.

Perceived relative similarity. As argued elsewhere (Insko et al., 2005), in ordinary language similarity is often used to describe qualitative categorical affiliation. Therefore, as a measure of participants' self-categorization, I assessed participants' perceived similarity between themselves and the members of their own team (sim_{own} ; "How similar do you perceive the members of your team to yourself?"), and the members of the opponent team ($sim_{opponent}$; "How similar do you perceive the members of the other team to yourself?") in the interdependent outcomes condition. Ratings were made on 7-point scales from 1 = *not similar at all* to 7 = *extremely similar*. To receive a single variable of actors' perceived relative similarity, I computed the algebraic difference of similarity ratings to own group members and opponent group members ($sim_{rel} = sim_{own} - sim_{opponent}$).

Analytic strategy

Again, participants in all conditions made their decisions independently, thus, the unit of analyses was the individual.

2.2.3 Results

Pretest

Two PDG matrices with varying indices of outcome correspondence were pretested: $r = -.80$ (see Figure 2B) and $r = -.88$ (see Figure 2C). Participants ($N = 28$) were students of the University of Jena. They made a decision (either to cooperate or to defect) for an anticipated interindividual interaction with an unknown opponent. Participants were randomly faced either with matrix 2B or with matrix 2C (14 participants in each experimental condition).

On matrix 2B, about 57% (8 out of 14) of participants decided to cooperate and about 43% (6 out of 14) decided to defect. On matrix 2C, however, only about 14% (2 out of 14) decided to cooperate and about 86% (12 out of 14) decided to defect. There were significantly more defective choices on matrix 2C than on matrix 2B ($p = .046$ by Fisher's exact test). In line with the assumption of a stronger conflict of interest with an index of correspondence of $r = -.88$ (2C) than with an index of correspondence of $r = -.80$ (2B), post-experimental assessment of choice-reasons showed support for more greed and fear involved in anticipated interactions on matrix 2C than on matrix 2B.

According to the hypotheses of the present study and the results of Study 1 (see subchapter 2.1.3), I expected the highest amount of cooperation in the independent outcomes/personal identity condition (compared to the other three experimental conditions). The pretest's framing of the interaction situation matched this condition. Therefore, to minimize the probability of a ceiling-effect, matrix 2B was used for the main experiment of Study 2.

Descriptive statistics

Overall, about 45% (75 out of 167) of the participants made a cooperative choice and 55% (92 out of 167) made a defective choice.¹³ Participants in the social identity condition showed a medium level of identification with the group they were assigned to (overestimators or underestimators; $M = 3.62$, $SD = 1.34$), indicating that the social categoriy had some value for them. Moreover, participants with a salient social identity

¹³ Three participants were excluded from the analyses because they stated that they already knew the PDG from lectures or previous experiments at the end of the experiment.

felt more similar to their outcome interdependent team members and more dissimilar to the opponent team members compared to participants with a salient personal identity; $F(1, 58) = 9.32, p = .003, \eta_p^2 = .14$; indicating that participants in the social identity condition categorized themselves and other participants as members of distinct social groups following the meta-contrast principle (e.g., Oakes & Turner, 1986; Turner et al., 1987).

Behavior in the PDG by experimental condition

The relative frequencies of defective PDG-choices in each experimental condition are shown in Table 4.

Table 4. Percentage of defective PDG-choices by experimental condition

	Interdependent outcomes	Independent outcomes
Social identity	75	60
Personal Identity	43	50

Because PDG-choice (*either C/cooperation or D/defection*) was assessed as a dichotomous variable in the PDG, the appropriate method for analysis is logistic regression (sometimes also called logit model). To test whether there was a (standard) discontinuity effect, the contrast between the interdependent outcomes/social identity condition and the independent outcomes/personal identity condition was used as a single predictor for PDG-choice in a logistic regression. As expected, there were more competitive choices in the interdependent outcomes/social identity condition than in the independent outcomes/personal identity condition; $B = 1.10, SE = 0.54, \chi^2(1, N = 80) = 4.11, p = .044, OR = .33$.

To examine the influence of outcome interdependence and identity salience on PDG-choices independently from each other, I used both variables and their interaction term to predict PDG-choice. Only identity salience emerged as a significant predictor of PDG-choice; $B = 0.89, SE = 0.35, \chi^2(1, N = 167) = 6.43, p = .011, OR = 2.43$. About 64% (49 out of 76) of the participants with a salient social identity, but only 47% (43 out of 91) of the participants with a salient personal identity made a defective choice. In other words, when holding all other predictors constant, participants with a salient

social identity were 2.4 times more likely to defect than participants with a salient personal identity. The main effect of outcome interdependence and the interaction of the two factors did not produce significant effects in the analysis; both $\chi^2(1, N = 167) < 2.5$, $p > .15$.

Reasons for PDG-choice and the role of perceived relative similarity

To check the association of participants' motivations and their respective choices in the PDG, I correlated the assessed motivations with PDG-choice (see Table 5); all correlations were in the expected directions.

Table 5. Correlation of defective PDG-choices (D) and reasons

	Defective PDG-choice (D)	Max own	Max rel	Min diff	Max joint
Max own	.40**				
Max rel	.44**	.49**			
Min diff	-.50**	-.66**	-.45**		
Max joint	-.59**	-.64**	-.47**	.72**	
Distrust	.18*	.06	.08	-.03	-.09

Note. Maximization of absolute outcome (max own), maximization of relative outcome difference (max rel), minimization of outcome difference (min diff), maximization of joint outcomes (max joint);

** $p < .01$, * $p < .05$

I was particularly interested in detecting the underlying motivations that might account for the effect of identity salience on PDG-choice. To answer this question, a multiple mediation analysis as recommended by Preacher and Hayes (2008) was performed. This procedure allows generating estimates for indirect effects in a multiple mediator model, which reduces the likelihood of parameter bias due to omitted variables as it may occur in several simple mediator models (Judd & Kenny, 1981). Thus, indirect effects of identity salience on PDG-choice through the proposed mediators max own, max rel, min diff, max joint, and distrust were estimated (see Figure 3).

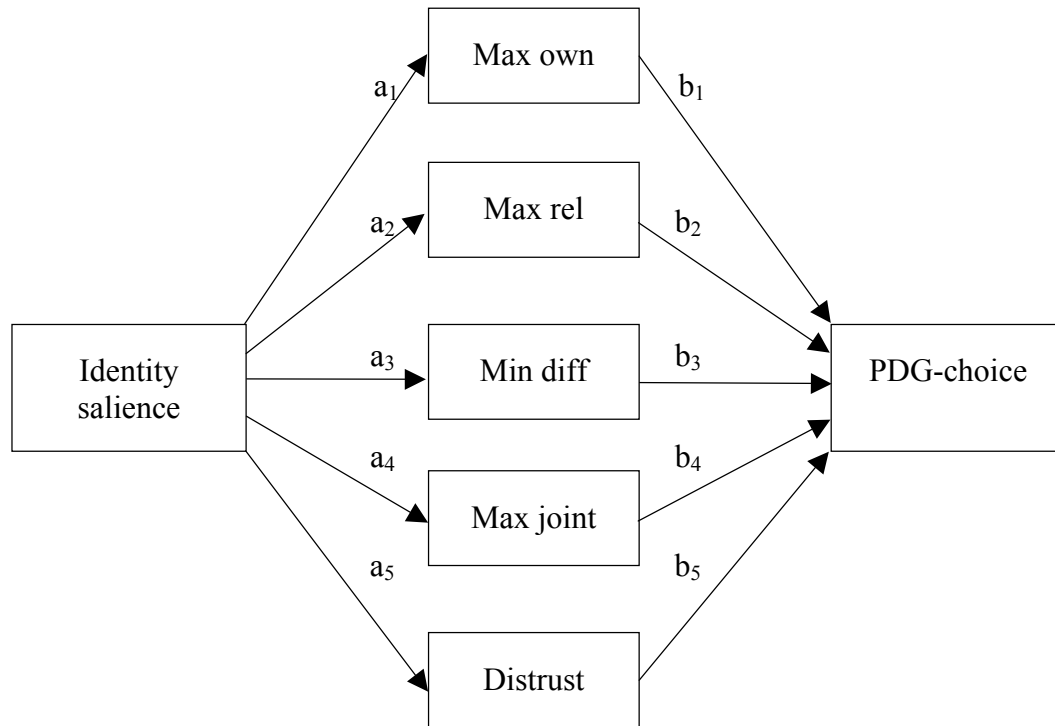


Figure 3. Multiple mediation model for the effect of identity salience on PDG-choice

Direct effects (a and b paths) as well as estimates and bias corrected bootstrapped 95%-confidence intervals for indirect effects (a*b paths) of all proposed mediator variables are shown in Table 6. The only indirect path that did not contain Zero in the intervals is that of max rel, indicating its significant indirect effect ($p < .05$). Social identity salience increased the motivation to maximize the relative outcome difference to the opponent(s); $B = -0.52$, $SE = 0.23$, $p = .023$. In turn, max rel predicted defective PDG-choices; $B = 0.40$, $SE = 0.18$, $p = .025$. Finally, when controlling for max rel (and all other mediator variables), the (direct) effect of identity salience on PDG-choice dropped to non-significance; $B = -0.80$, $SE = 0.44$, $\chi^2(1, N = 167) = 3.35$, $p = .067$.

Table 6. Direct and indirect effects of the multiple mediation model

Proposed mediator	Direct effects						Indirect effect			
	a path			b path			a*b path			
							Bootstrapped			
							BC 95% CI			
	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>B</i>	<i>SE</i>	Low	Up
Max own	0.16	0.32	.626	-0.13	0.14	.374	-0.02	0.08	-.316	.064
Max rel	-0.52	0.23	.023	0.40	0.18	.025	-0.21	0.16	-.641	-.003
Min diff	0.03	0.29	.921	-0.25	0.17	.143	-0.01	0.10	-.248	.156
Max joint	0.13	0.27	.627	-0.72	0.19	.001	-0.09	0.22	-.558	.330
Distrust	-0.21	0.28	.465	0.20	0.12	.082	-0.04	0.08	-.270	.064

Note. Proposed mediators: maximization of absolute outcome (max own), maximization of relative outcome difference (max rel), minimization of outcome difference (min diff), maximization of joint outcomes (max joint), distrust; a path: identity salience on proposed mediator; b path: proposed mediator on PDG-choice (controlling for identity salience); BC 95% CI: bias corrected 95% confidence interval with lower (low) and upper (up) border, 10,000 bootstrap resamples, CIs that do not contain Zero indicate a significant indirect effect with $p < .05$

I was interested how participants' perceived relative similarity relates to their motivation to compete (max rel), and PDG-choice. Unfortunately, perceived relative similarity could be deduced from similarity ratings to members of the own team and the opponent team in the interdependent outcomes condition only (as there were no teams in the independent outcomes condition). Therefore, I tested whether perceived relative similarity might account for behavioral differences within the interdependent outcomes condition (salient personal vs. social identity). In line with the meta-contrast principle, I expected that interdependent team members with a salient social identity perceive greater similarity to own group members than to opponent group members, and that this motivates them to maximize relative outcomes, which would result in more defective PDG-choices relative to interdependent team members. In other words, the effect of identity salience (X) on PDG-choice (Y) should be sequentially mediated by participants' relative similarity (M_1) and the motivation max rel (M_2). Figure 4 displays the respective paths in the hypothesized three-path mediation model.

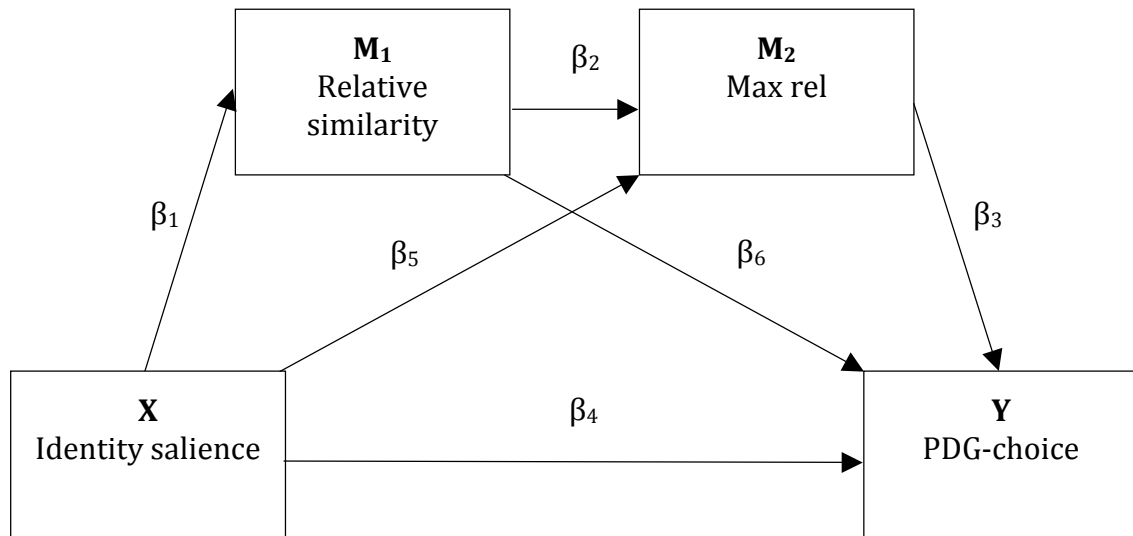


Figure 4. Proposed three-path mediation model

Following the recommendations of Taylor, MacKinnon, and Tein (2008), I first estimated the impact of identity salience on relative similarity (path 1); $B = -0.77$, $SE = 0.25$, $\beta = -.38$, $p = .003$. This result indicates that team members with a salient social identity perceived greater similarity to their outcome interdependent team members and more dissimilarity to members of the opponent team compared to team members with a salient personal identity. Second, the impact of relative similarity on max rel was estimated, while controlling for identity salience (path 2); $B = 0.52$, $SE = 0.19$, $\beta = .34$, $p = .009$. Perceived relative similarity intensified the motivation to maximize the relative outcome difference.¹⁴ Finally, I estimated the impact of the max rel on the PDG-choice, while controlling for identity salience and relative similarity (path 3); $B = 1.07$, $SE =$

¹⁴ Edwards (1994) suggested using both minuend and subtrahend as single predictors in the regression equation instead of their difference score to overcome various methodological problems that arise when using algebraic difference scores as independent variables (see also Cronbach & Furby, 1970). However, he also claimed that the model implied by the algebraic difference score is tenable if certain requirements are fulfilled: minuend and subtrahend have to be significant predictors if entered simultaneously in the equation, and the coefficients of the components have to be opposite in sign and not significantly different in absolute magnitude (see Edwards, 1994 for further information). In fact, regressing max rel on both sim_{own} and $sim_{opponent}$ simultaneously revealed that the requirements were not violated (sim_{own} : $B = 0.62$, $SE = 0.21$, $\beta = .51$, $p = .004$; $sim_{opponent}$: $B = -0.67$, $SE = 0.19$, $\beta = -.59$, $p = .001$). I am therefore confident regarding the validity of the reported results.

0.31, $\chi^2(1, N = 59) = 12.10, p = .001$.¹⁵ Mediation in three-path mediation models can be shown using the joint significance test, which offers good control for Type-I errors and has good power performance (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). According to the joint significance test, all three paths have to be significantly different from zero. As this was the case in the present model, I conclude that the three-path model of mediation supports the assumption that identity salience affects PDG-choices through a mediational chain of perceived relative similarity and an associated concern to maximize relative outcome differences. Alternating the sequence of the mediators ($X \rightarrow M_2 \rightarrow M_1 \rightarrow Y$) produced a non-significant effect of relative similarity on PDG-choice, while controlling for identity salience and max rel (path 3); $B = 0.80, SE = 0.55, p = .147$. This supports the proposed order of the two mediators.

2.2.4 Discussion

Study 2 replicated the findings of Study 1 with a rather conservative and often used mixed-motive situation, the prisoner's dilemma game. Again, a significant discontinuity effect emerged that was due to a significant main effect of identity salience. As in Study 1, outcome interdependence and the outcome interdependence \times identity salience interaction did not significantly account for any further variance, even though the sample size was sufficiently large to detect medium effect sizes ($1 - \beta = .97$; J. Cohen, 1988; Faul et al., 2009).

Furthermore, the experiment revealed additional insights into the psychological processes that might underlie the effect of identity salience on PDG-choice. First, a multiple mediation analysis revealed that participants in the social identity condition were more concerned to maximize the relative gain (max rel) than participants in the personal identity condition. Furthermore, the increase in defective choices in the social identity condition compared to the personal identity condition can be attributed to this type of motivation, indexing a competitive ingroup bias. This finding is consistent with previous studies demonstrating that the tendency to maximize the relative advantage of one's own group may account for increased defection by groups compared to

¹⁵ Estimations of path 1 and 2 were obtained with linear regressions, whereas path 3 was estimated with logistic regression. Regression equations were $M_1 = \beta_{01} + \beta_1 X + \varepsilon_1$ for path 1, $M_2 = \beta_{02} + \beta_2 M_1 + \beta_5 X + \varepsilon_2$ for path 2, and $Y = \beta_{03} + \beta_4 X + \beta_3 M_2 + \beta_6 M_1 + \varepsilon_3$ for path 3, with $\beta_{01}, \beta_{02}, \beta_{03}$ being the intercepts and $\varepsilon_1, \varepsilon_2, \varepsilon_3$ being the residuals.

individuals (e.g., Insko et al., 2005; Pinter et al., 2007; Wildschut et al., 2001, 2001). Moreover, analyses of the interdependent outcomes condition supported the assumption that the increased competitive motivation and the resultant boost of defective PDG-choices was mediated by participants' perceived relative similarity to their team members (more similar to own team members than to opponent team members). This finding was in line with my prediction that the minimal group assignment increases participants' social identity salience and that this may be sufficient to increase competitiveness in interaction with outgroup members compared to actors with a salient personal identity who interacted with random team members and opponents. Results suggested that actors' motivation to maximize the relative outcome difference to the opponent(s) might be rather a result of social identity processes than of structural differences between interindividual and intergroup interactions (i.e., participants' outcome interdependence), supporting the identity-based perspective on interindividual-intergroup discontinuity.

However, neither Study 1 nor Study 2 included a "relative" manipulation-check of identity salience in the social identity *and* personal identity condition across both outcome interdependence conditions. Although Study 2 provided initial support for the notion that participants' perceived relative similarity to other actors might account for behavioral differences in the interdependent outcomes condition (interdependent outcomes/social identity vs. interdependent outcomes/personal identity), it is not clear whether there are similar or different psychological processes at work in the independent outcomes condition (independent outcomes/social identity vs. independent outcomes/personal identity). One might argue that a salient categorical distinction into ingroup and outgroup may be easily triggered through a minimal group manipulation in the interdependent outcomes condition, as there are teams and not individuals as opponents. However, it is questionable whether categorization processes may also account for the (anyway smaller) behavioral differences in the independent outcomes condition where interactions are factual between two individuals. Study 3 addressed this limitation in the process analysis of the independent outcomes condition.

2.3 *STUDY 3*

With the present study I aimed to shed light on the behavioral differences among independent actors (1 : 1) with a salient personal vs. social identity and the underlying psychological processes.

Study 2 was only able to show the influence of perceived social categorization on mixed-motive game behavior in the interdependence outcomes condition. This was due to the utilized measure of perceived relative similarity, based on the meta-contrast principle of social categorization (e.g., Turner et al., 1987), and requiring similarity ratings of opponents *relative* to the own team. There were no interacting teams in the present study and, therefore, similarity to the opponent could only be assessed absolutely. However, absolute similarity to the opponent is a less accurate representation of the meta-contrast ratio than the similarity of own team members relative to opponent team members (relative similarity), as measured in Study 2. Additionally, it has been shown that the link between social identity salience and ingroup bias cannot be reduced to a mere effect of perceived similarity (Billig & Tajfel, 1973), although both factors may often occur together and perceived relative similarity may be a proxy of categorical affiliation in ordinary language (Insko et al., 2005).

To overcome these limitations in the psychological assessment of identity salience in the present study, I used a measure of identity salience that (1) can be applied to an experimental context with individual opponents, and (2) that does not depend on similarity ratings: actors' perceived categorization.

2.3.1 Hypotheses

I expected that participants in the social identity condition would be less cooperative than participants in the personal identity condition. Moreover, this effect should be mediated by participants' perceived categorization (see Figure 5).

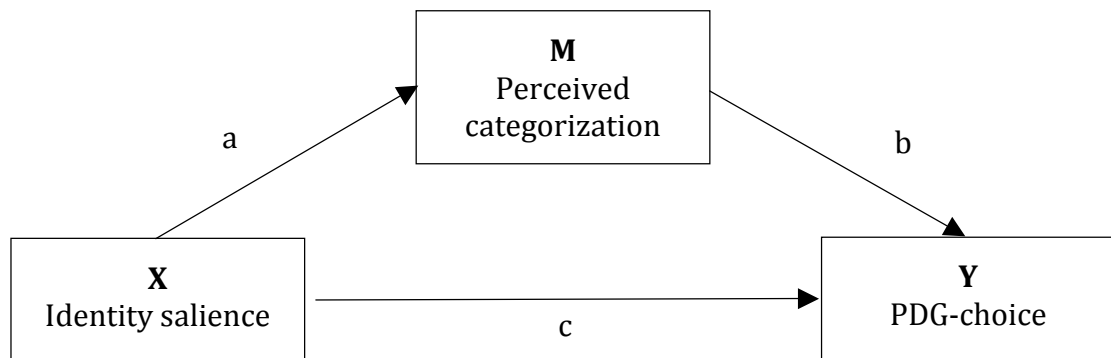


Figure 5. Proposed mediation model

2.3.2 Method

Participants and experimental design

Participants were 72 students (22 men, 50 women) from various disciplines of the University of Jena. Age of participants ranged from 19 to 40 years ($MD = 23$). All participants had the possibility to earn up to 7 € (overall earnings of $M = 3.27$ €). The experiment used a one-factorial (identity salience: personal vs. social identity) between-subjects design. Participants were randomly assigned to one of the experimental conditions (36 participants in each condition with 18 participants per experimental session).

Procedure

The procedure and manipulation of identity salience was identical to Studies 1 and 2: Participants in the social identity condition interacted with an individual member of the opposite social category (overestimator : underestimator). Participants in the personal identity condition had a randomly chosen opponent (random opponent matching). Participant's decision affected only his or her own and the opponent's outcome (1 : 1, independent outcomes). After the instructions but before participants made their decisions, their perceived categorization was assessed. After decision-making, participants filled out a short post-experimental questionnaire assessing demographics, then they were paid and dismissed. The whole experiment took about 30 minutes.

Dependent variables

Behavior in a PDG. Participants were faced with the same PDG matrix (including the same incentive scheme) as in Study 2 (see Figure 2B in subchapter 2.2.2).

Group identification. As in the previous studies, participants in the social identity condition answered four items regarding their identification with the social category they were assigned to (Doosje et al., 1995; Cronbach's $\alpha = .79$).

Perceived categorization. To measure participants' self-categorization, their cognitive representation of the aggregate of all participants in the experimental session was assessed. Following S. L. Gaertner, Mann, Murrell, and Dovidio (1989), participants were asked how much they perceived the participants of the experimental session as (1.) one group, (2.) two groups, or (3.) individuals (all items presented on the same screen). Ratings were made on 7-point scales from 1 = *completely disagree* to 7 = *completely agree*.

Analytic strategy

As in Studies 1 and 2, participants made their decisions independently, thus, the unit of analyses was the individual.

2.3.3 Results*Descriptive statistics*

Tables 7 shows the relative frequencies of defective PDG-choices, as well as mean values and standard deviations of perceived categorization, separately for each experimental condition. Overall, about 38% (27 out of 72) of the participants made a cooperative choice and 63% (45 out of 72) made a defective choice. Participants in the social identity condition showed a medium level of identification with the social group they were assigned to according to their result in the judgment task (overestimators or underestimators; $M = 3.53$, $SD = 1.29$), indicating that the social category was valuable for them.

Table 7. Percentage of defective PDG-choices, mean values and standard deviations of perceived categorization by experimental condition

Experimental condition	PDG-choice	Perceived categorization		
		One group	Two groups	Individuals
Personal identity	53	3.36	2.50	5.78
		(1.55)	(1.54)	(1.40)
Social identity	72	3.58	3.94	5.72
		(2.05)	(2.24)	(1.86)

Note. Standard deviations in brackets

Behavior in the PDG by experimental condition

Nineteen out of thirty-six participants in the personal identity condition defected, whereas twenty-six out of thirty-six participants in the social identity condition did so, yielding a significant difference (path c); $B = 0.84$, $SE = 0.50$, $\chi^2(1, N = 72) = 2.85$, $p = .046$ (one-tailed), $OR = 2.33$. In other words, participants with a salient social identity were 2.3 times more likely to defect than participants with a salient personal identity.

Perceived categorization

Overall, perception of all participants as individuals correlated negatively with perception of all participants as one group ($r = -.29$, $p = .013$), but not with perception of all participants as two groups ($r = -.09$, $p = .463$). Perception as one group and two groups correlated negatively ($r = -.22$, $p = .069$). To examine whether the manipulation of identity salience had a significant effect on perceived categorization, I conducted one-way analyses of variance (ANOVA) for the perception of all participants as individuals, two groups, and one group separately. There was a significant difference between the social identity and personal identity conditions on the perception of two groups; $F(1, 71) = 10.16$, $p = .002$, $\eta_p^2 = .13$. As expected, participants in the social identity condition perceived the aggregate of all participants more as two distinct groups

compared to participants in the personal identity condition. Values of perceptions as individuals and one group did not differ between conditions (both F s < 1).¹⁶

To test whether perception of all participants as two groups relates to behavioral differences in the PDG, a mediation analysis as recommended by Preacher and Hayes (2004) was performed. In a first step, perceived categorization as two groups was regressed on identity salience. Identity salience predicted perceived categorization as two groups (path a); $B = -1.44$, $SE = 0.45$, $p = .002$. In a second step, PDG-choice was regressed on identity salience and perceived categorization as two groups simultaneously (path b). The relation of perceived categorization as two groups and PDG-choice was significant; $B = 0.37$, $SE = 0.15$, $p = .015$. Importantly, the bias-corrected bootstrapped 95% confidence interval of the product term of path a and b did not include Zero, indicating a significant indirect effect; $B = -0.53$, $SE = 0.32$, $CI_{95} = [-1.35, -.11]$. The direct effect of identity salience on PDG-choice while controlling for perceived categorization as two groups was no longer significant (path c'); $B = -0.44$, $SE = 0.54$, $p = .418$. Taken together, the mediation analysis supports the assumption that actors in the social identity condition perceived all persons in the experimental session more as members of two distinct groups than persons in the personal identity condition, which in turn produced a behavioral difference in PDG-choices, that is more defection in the social identity condition than in the personal identity condition.

2.3.4 Discussion

Results of Study 3 confirmed the hypotheses: There was a meaningful behavioral difference between the personal and social identity conditions. Under social identity salience actors were about two-times more likely to defect than actors under personal identity salience. This effect is remarkable because actors interacted as individuals, without positive outcome interdependence between participants. The finding is supportive of the robustness of the proposed identity-based perspective on interindividual-intergroup discontinuity.

¹⁶ Alternatively, one may argue that social identity salience is characterized by the *difference* between participants' perceptions of all participants as separate individuals and two groups. Predicting the algebraic difference score by identity salience revealed a significant effect; $F(1, 71) = 5.94$, $p = .017$, $\eta_p^2 = .13$. This indicates that participants in the social identity condition perceived all persons more as members of two groups *relative* to their perception of all persons as separate individuals than participants in the personal identity condition did.

In addition, the mediation analysis supported the assumption that actors' perceived categorical distinction of all participants in in ingroup and outgroup was accountable for the effect. Insko and colleagues (2005, Study 2) found that actors who interacted with outgroup members perceived all subjects more as two groups than actors who interacted with ingroup members. In Insko and colleagues' study all actors acted under social identity salience (i.e., all opponents were assigned according to a minimal group procedure) and behavioral differences can be attributed to a salient ingroup vs. outgroup differentiation. The previous study, however, is the first one that can attribute a behavioral difference in mixed-motive game behavior to a mere effect of identity salience (i.e., salient personal vs. social identity) in the context of interindividual (i.e., outcome independent) interactions. In other words, defection under social identity salience with outgroup members may not only be more prevalent compared to interactions under social identity salience with ingroup members (as shown by Insko et al., 2005), but also compared to interactions with random opponents under personal identity salience.

In Studies 1, 2, and 3, identity salience was manipulated via an artificial minimal group assignment procedure. This procedure allowed disentangling the impact of identity salience on interindividual-intergroup discontinuity from other factors that are typically confounded with social categorization in the classical discontinuity paradigm (e.g., positive outcome interdependence among team members). In order to establish identity salience as a potential source of the standard discontinuity effect, however, it is necessary to show that social identity salience is in fact induced in the classical discontinuity paradigm, that is, in the absence of an artificial minimal group manipulation. Therefore, the next experiment aimed at investigating a possible source of social identity salience within the classical discontinuity paradigm that is only available for team actors but not for individual actors: intragroup discussions prior to decision-making.

2.4 STUDY 4

Identity salience is often conceptualized (and operationalized) as the likelihood that one identity will be activated in a give context (i.e., personal or social identity). According to Tajfel (1978, 1981) there are several features of social situations that might lead people shifting from a personal identity salience to a social identity salience, for instance impermeable group boundaries, the clarity of awareness of group membership, and the extent to which the group membership is associated with positive or negative evaluations.

In the context of the classical discontinuity paradigm, there are two structural features of the interaction situation that might increase social distinctiveness and facilitate social identity salience in the intergroup interaction condition: intergroup and intragroup discussions. On the one hand, discussions between opponents prior to decision-making are not exclusive to the intergroup interaction condition – they may be either between individual opponents (interindividual interaction condition) or between opposing teams (intergroup interaction condition). Between-opponent discussion may increase the discontinuity effect because trust is more effectively established in interindividual discussion than in intergroup discussion (Wildschut et al., 2003; see also subchapter 1.2.1). Therefore, the effect of between-opponent discussion on interindividual-intergroup discontinuity might be rather driven by a “positive” effect of interindividual discussion (i.e., leading to more cooperation) than by a “negative” effect of intergroup discussions (i.e., leading to less cooperation). Because these mechanisms are inherently confounded, it is difficult to “filter” the mere effect of intergroup discussion on identity salience. On the other hand, intragroup discussions are an exclusive characteristic of intergroup interactions, as there are no team members with whom individual actors can discuss. A large body of research on the *group discussion effect* indicates that an intragroup discussion, as it has been present in many of the previous studies on the discontinuity effect, creates commitments and a common ingroup identity by emphasizing the similarities to the ingroup members, which in turn increases the motivation to act in the interest of the own group (for reviews see Sally, 1995; Samuelson & Watrous-Rodriguez, 2010). In other words, actors’ identity as group members becomes salient through intragroup discussion, resulting in the motivation to act in the interest of the discussion group “without regard to any self-interest calculus at all” (Van de Kragt, Dawes, Orbell, Braver, & Wilson, 1986, p. 181).

Consequently, group members having an intragroup discussion prior to an intergroup interaction should be more likely to defect than individual actors, but also compared to members of a team who did not engage in an intragroup discussion (e.g., Bornstein, 1992; Bornstein, Rapoport, Kerpel, & Katz, 1989; Halevy, Bornstein, & Sagiv, 2008). In the present study, I was interested in investigating the effect of intragroup discussion on the activation of social identity salience. Therefore, the minimal group assignment procedure was replaced with an intragroup discussion manipulation. The basic idea was that a group discussion alone suffices to create a common social identity, and consequently should lead to less cooperative choices in a subsequent intergroup interaction.

Introducing intragroup discussions, however, entails problems with regard to confounding variables. First, as intragroup discussions are only available prior to intragroup or intergroup interactions, the influence of actors' identity salience on decision-making is confounded with actors' outcome interdependence. Second, intragroup discussions might not only create a salient social identity among participants of such a discussion. It has been argued that group discussions might also increase the chances that the individually rational solution for a mixed-motive situation is identified, leading to more selfish choices (Bornstein et al., 2004; Bornstein & Yaniv, 1998; Davis, 1992; Kerr, MacCoun, & Kramer, 1996). According to this *group rationality hypothesis*, decreased cooperation following an intragroup discussion might be rather a result of actors' better understanding of the complex game situation, strengthening the tendency to act selfishly (i.e., defect). Testing for a specific link between intragroup discussions and social identity salience thus requires a control for outcome interdependence and rationality effects.

These issues were addressed in the present study as follows: The experiment contained three conditions. In a standard baseline condition, individual (outcomes independent) actors played a PDG against another randomly assigned opponent without having participated in a group discussion (personal identity salient, no rational insight due to group discussion). All other actors were first assigned to separate discussion groups and discussed the rules of the game and possible strategies. Subsequently, each participant had to select an individual response for a PDG that was played against an individual member of a different discussion group (social identity salient/outgroup opponent, potential increase in rational insight due to group discussion), but they also had to make a decision for a PDG that was played against another individual member of

their own discussion group (social identity salient/ingroup opponent, potential increase in rational insight due to group discussion).¹⁷

Importantly, as all actors interacted individually (1 : 1), outcome interdependence cannot account for any behavioral differences between the experimental conditions. Moreover, the experimental design allowed us to test two hypotheses: According to the social identity hypothesis (e.g., Tajfel & Turner, 1979, 1986), participants attending a group discussion prior to decision-making should select more defective choices when playing against a member of a different discussion group than when playing against a member of their own discussion group. This reflects an increased competitiveness that is due to a motivation to optimize the relative advantage of the own group compared to another group. According to the group rationality hypothesis (e.g., Bornstein & Yaniv, 1998), however, actors in the group discussion condition should select more selfish choices compared to individuals that had not participated in a group discussion, regardless of whether the PDG is played against a member of the own discussion group or against a member of another discussion group. If, as a result of an intragroup discussion, the defective choice is perceived as being the most rational choice, it is then irrelevant whether opponents are ingroup or outgroup members.¹⁸

2.4.1 Hypotheses

Following the group discussion effect literature, I expected that an intragroup discussion would be sufficient to make actors social identity salient. Accordingly, I hypothesized that interactions between outcome independent actors of different discussion groups (i.e., social identity salient/outgroup members) would be less cooperative than interactions between members of the same discussion group (i.e., social identity salient/ingroup members), as well as interactions between opponents that did not have an intragroup discussion prior to decision-making (i.e., personal identity

¹⁷ Participants were informed before the discussions that they had to play against members of another discussion group. They were *not* explicitly informed of the decision they had to make regarding a game against another person of the same discussion group in order to prevent that specific commitments and arrangements were made regarding intragroup interactions.

¹⁸ Even though actors might expect that ingroup members are more likely to cooperate than outgroup members (e.g., Brewer, 2008), they are always better off by choosing defection as $u(D, C) > u(C, C)$, which is from their individual perspective the dominant strategy.

salient/random opponents). However, according to the group rationality hypothesis (e.g., Bornstein & Yaniv, 1998), interactions that followed an intragroup discussion – irrespective whether with ingroup or outgroup opponents – should be less cooperative than interactions without a preceding discussion.

2.4.2 Method

Participants and experimental design

Participants were 48 students and staff members (15 men, 33 women) from various disciplines of the University of Jena. Age of the participants ranged from 19 to 31 years ($MD = 24$). All participants got a show-up fee of 2.5 € and had the possibility to earn additionally up to 7 € ($M = 4.50$ €). The experiment used a 2 (intragroup discussion: discussion vs. no discussion; between-subjects) \times 3 (opponent: random vs. ingroup vs. outgroup; within/between-subjects, ingroup and outgroup nested within the discussion condition) mixed design. Participants were randomly assigned to one of the two between-subjects conditions. All participants made two decisions: Participants in the discussion condition decided whether to cooperate or defect with an opponent (1) from their own discussion group (ingroup) and (2) from the other discussion group (outgroup). Participants in the no discussion condition made two independent decisions with randomly selected opponents. Respective cell sample sizes were balanced over the between-subjects factors (24 in each condition).

Procedure

Participants registered for the experimental sessions, each consisting of 12 participants. After arrival at the laboratory they were seated individually in cubicles. Instructions and decision-making were computer-mediated. The welcome procedure was similar to previous studies. First, participants got trained on the *interactive decision-making task*, including instructions, examples and test questions. Afterwards, participants in the discussion condition were randomly assigned to one of two discussion groups: A or B. They were told that both groups (each consisting of 6 participants) would have a 10-minutes discussion on the decision situation in a separate room. It was further explained that after the discussion each of them would have to

interact independently (1 : 1) with an opponent from the other discussion group. Participants were then guided to the two discussion rooms (both located on the same corridor, opposite to the laboratory), where they were seated around a table with printouts of the rules of the game and its payoffs. The experimenter started a video camera, recording the discussion and left the room. After 10 minutes the experimenter entered the room and guided the participants back to their individual cubicles in the laboratory. Then, participants were informed that additionally to the announced interaction with an opponent from the other discussion group, there would be also an interaction with a randomly selected opponent from their own discussion group. Consequently, participants made two decisions. Both decisions were made on the same computer-screen, with random left-right-arrangement. One of the decisions was selected randomly for payment. Participants in the no discussion condition made also two decisions, however, since there was no ingroup and outgroup due to discussion, both with randomly selected opponents. Thus, the no discussion condition was equal to the personal identity condition in Studies 1, 2 and 3. After making their decisions, participants completed a short post-experimental questionnaire assessing demographics, were informed about their payoff, paid and dismissed. The whole experiment took about 30 minutes in the no discussion condition and 45 minutes in the discussion condition.

Dependent variable

Behavior in a prisoner's dilemma game on the same PDG-matrix as in Studies 2 and 3 (see Figure 2B in subchapter 2.2.2) was assessed as a measure of participants' cooperative/defective intent.

Analytic strategy

Participants in all conditions made individual decisions. However, participants made not only one decision as in Studies 2 and 3 but two decisions (discussion condition: one decision with an ingroup opponent and one decision with an outgroup opponent; no discussion condition: two decisions each with a random opponent). Due to this within-subjects manipulation, observations were nested within participants and might therefore be interdependent. Moreover, participants in the discussion condition were members of specific discussion groups (2 discussion sessions \times 2 groups per

session [A and B] = 4 separate discussion groups). Hence, participants of same discussion groups might be interdependent. This data structure introduces problems with respect to appropriate levels of analysis, aggregation bias, and heterogeneity of regression (e.g., Raudenbush & Bryk, 2002). To address this nested data structure, I conducted generalized linear mixed effect model analyses (with a logit link), using the *lme4* package (Bates, 2007) in the R environment (R Development Core Team, 2008). Intragroup discussion and opponent were modeled as fixed factors, whereas participant and discussion group were modeled as random factors to control for their error terms (*random intercept models*, e.g., Pinheiro & Bates, 2009).

2.4.3 Results

Relative Frequencies of defective PDG-choices per experimental condition are shown in Table 8.¹⁹

Table 8. Percentage of defective PDG-choices by experimental condition

Opponent	Discussion	No discussion
Outgroup	71	
Ingroup	50	
Random		54

Note. Random opponent choices are averaged over two decisions per participant

To disentangle the two competing hypotheses, two contrasts were used as predictors of PDG-choice (0 = cooperation, 1 = defection). First, in line with the social identity hypothesis, a 2 (discussion/outgroup opponent) -1 (discussion/ingroup opponent) -1 (no discussion/random opponent) contrast was tested. The contrast was significant; $B = 0.97$, $SE = 0.56$, $z = 1.73$, $p = .042$ (one-tailed). As predicted, actors who had an intragroup discussion prior to an outgroup interaction were more defective than actors who either had an intragroup discussion prior to an ingroup interaction or

¹⁹ One participant was excluded from the analyses because he/she stated that he/she already knew the PDG from lectures or previous experiments at the end of the study.

who had no intragroup discussion prior an interaction with a random opponent.²⁰ Second, in line with the group rationality hypothesis, a 1 (discussion/outgroup opponent) 1 (discussion/ingroup opponent) -2 (no discussion/random opponent) contrast was tested. The contrast missed conventional criteria of significance; $B = 0.30$, $SE = 0.49$, $z = 0.60$, $p = .55$.

2.4.4 Discussion

The current study investigated the underlying psychological process that might be responsible for the relation of intragroup discussions prior to intergroup decision-making and the interindividual-intergroup discontinuity effect. I contrasted two different explanations why intragroup discussions might increase the discontinuity effect: the social identity hypothesis (e.g., Van de Kragt et al., 1986) and the group rationality hypothesis (e.g., Bornstein & Yaniv, 1998). Results supported the social identity hypothesis: Independent actors were less cooperative in interaction with outgroup opponents than with ingroup opponents or random opponents. In contrast to the group rationality hypothesis, however, ingroup and outgroup opponent interactions following an intragroup discussion were not less cooperative than interactions among random opponent without a preceding discussion. Importantly, actors outcome interdependence cannot account for the findings, as opponent in all conditions acted under conditions of outcome independence (1 : 1).

Thus, the results of the present experiment supported my assumption that intragroup discussions are a possible source of actors' social identity salience in the classical experimental paradigm on interindividual-intergroup discontinuity. This indicates that identity salience is not only sufficient to produce the interindividual-intergroup discontinuity effect (see Studies 1, 2, and 3), but might also have contributed to the discontinuity effects found in previous research (at least if there was an intragroup discussion prior to intergroup decision-making).

It should be noted that the statistical test power in the present experiment was rather poor due to the small sample size and the nested data structure (for further discussion see Snijders, 2005). This might be an important limitation when rejecting hypotheses like the group rationality hypothesis in the present experiment (J. Cohen,

²⁰ Additionally, the simple contrast between ingroup and outgroup member opponent within the discussion condition was significant; $B = 1.16$, $SE = 0.65$, $z = 1.77$, $p = .035$ (one-tailed).

1988). However, the current study was designed to distinguish between behavioral differences following an intragroup discussion *either* due to actors' social identity salience *or* due to actors' rational comprehension. As the data supported the former but not the latter hypothesis, I argue that identity processes become an important predictor of mixed-motive game behavior following an intragroup discussion. It might still be the case that intragroup discussions increase actors' rational insight in the game structure and I abstain from further interpreting this null-effect.

In sum, the present study clearly supported the assumption that intragroup discussions prior to intergroup interactions may create or strengthen the salience of social identity. As those discussions took place in most of previous experiments on interindividual-intergroup discontinuity, identity salience might at least partially account for the discovered discontinuity effects, further supporting the proposed identity-based perspective on interindividual-intergroup discontinuity.

3 GENERAL DISCUSSION

This dissertation investigated minimal conditions for the interindividual-intergroup discontinuity effect, that is, the tendency for intergroup relations to be less cooperative than interindividual relations (e.g., Schopler & Insko, 1992; Schopler et al., 2001). I reviewed previous research, which identified several moderator variables (e.g., Wildschut et al., 2003) and offered various explanations (e.g., Wildschut & Insko, 2007) for this robust phenomenon.

Aims and research questions of the present studies have been developed with regard to two general perspectives of group formation: the interdependence-based and the identity-based approach (Campbell, 1958; Wilder & Simon, 1998). Research on the discontinuity effect typically treated groups as aggregates of interdependent actors (interdependence-based perspective; e.g., Lewin, 1948). However, other researchers have argued that the mere representation of individual actors as members of distinct social groups (salient social identity) without a factual interdependence between ingroup members may create group entitativity (identity-based perspective; e.g., Tajfel, 1981), resulting in a preference to favor ingroup members relative to outgroup members (Tajfel & Turner, 1979, 1986). This dissertation disentangled the influence of both processes – interdependence-based and identity-based group formation – for the emergence of the discontinuity effect, offering an identity-based perspective on interindividual-intergroup discontinuity.

3.1 *DISENTANGLING OUTCOME INTERDEPENDENCE AND IDENTITY SALIENCE*

3.1.1 Behavioral differences

As outlined in the present thesis, interdependence-based and identity-based group processes have been confounded in previous research on interindividual-intergroup discontinuity. I have claimed that in the intergroup interaction condition of the classical discontinuity design actors are both interdependent *and* have a salient social identity. In contrast, actors in the interindividual interaction condition are both independent *and* have a salient personal identity. Thus, relying on previous research it is

not possible to state whether the discontinuity effect is due to actors' independence (interindividual interaction) vs. interdependence (intergroup interaction) or due to actors' salient personal identity (interindividual interaction) vs. salient social identity (intergroup interaction), or due to a combination of both factors.

Study 1 was designed to distinguish between the effects of identity salience (salient personal vs. social identity) and interdependence (independent vs. interdependent actors) on the emergence of interindividual-intergroup discontinuity. For this purpose, identity salience and interdependence were manipulated orthogonally. Further structural differences between the classical interindividual and intergroup interaction conditions were excluded (e.g., intragroup discussion prior to intergroup decision-making). Based on social identity theory (SIT; Tajfel & Turner, 1979, 1986) and recent experimental findings (e.g., De Cremer et al., 2008; Wit & Kerr, 2002), I expected that mere identity-based groups might be less cooperative than individual actors. In other words, identity-based group formation should be sufficient to create the discontinuity effect, irrespective of actors' outcome interdependence. As hypothesized, Study 1 revealed a significant main effect of identity salience on proposals in an ultimatum bargaining game (UG). Actors with a salient social identity were less cooperative – they made smaller offers in the UG – than actors with a salient personal identity. There was no effect of outcome interdependence. Hence, to the best of my knowledge, this study is the first that attributes a discontinuity effect – indicated by a significant contrast between the social identity/interdependent outcomes condition and the personal identity/independent outcomes condition – to the mere influence of identity salience.

3.1.2 Limitations

One should note that the failure to detect a significant effect of outcome interdependence does not mean that a positive interdependence among team members might not at all increase the discontinuity effect. Wildschut and colleagues (2003) found in a meta-analytic review that procedural interdependence among team members is an important moderator of interindividual-intergroup discontinuity. However, outcome interdependence – as manipulated in the present research – is only one component of procedural interdependence, besides a required consensus among team members to reach a joint decision (e.g., Wildschut et al., 2001). Clearly, by manipulating mere

outcome interdependence, interdependence among team members was condensed to an absolute minimum. Already prior research found that mere outcome interdependence between actors of a team did not decrease cooperation in intergroup interactions compared to interindividual interactions with outcome independent actors (Insko, Pinkley, Harring et al., 1987; Insko et al., 1988).

It is also important to note that the manipulation of outcome interdependence did slightly differ from previous studies. If not using a consensus rule (e.g., Bornstein & Yaniv, 1998; Wolf et al., 2008), outcome interdependence was typically created by means of a majority rule, that is, the predominant decision of team members served as the group's decision (e.g., T. R. Cohen et al., 2006; Schopler et al., 1995). In contrast, in the present research one team member's decision was selected randomly (with $p = 1/3$) and served as the group's decision. The main reason to use this procedure was to exclude "strategic decisions" in the UG. Because cooperation/defection was measured as a continuous variable here (offers and minimum acceptance thresholds may range from 0 to 100 ECU), a majority rule would have to be implemented by the mean value of team members' decisions. If actors assume that their team members' decisions are too cooperative or too defective, they might personally decide to make an extreme value in the opposite direction to adjust the teams' mean value according to their personal preference. From the perspective of actors' personal impact on the group decision, both procedures are exactly the same, as in both cases the expected impact is $1/3$. However, it might be that the subjectively perceived impact on the team decision differs between both procedures.

Last but not least, the manipulation of outcome interdependence aimed to investigate and control for the mere effect of *objective* outcome interdependence on the interindividual-intergroup discontinuity effect. However, actors with a salient social identity might perceive to have a common fate with their ingroup members, that is *perceived* outcome interdependence. Although this distinction goes beyond the scope of the present thesis, I argue that perceived interdependence might be an effect of identity-based group formation (see also Turner, 1999)

Summing up these possible skepticisms regarding the observed null-effect of outcome interdependence: Because outcome interdependence is a specific component of (procedural) interdependence and the type of manipulation was exceptional, the null-effect of actors' interdependence on decision-making has to be interpreted with caution. Nevertheless, the study's experimental paradigm offers an innovative approach to

investigate effects of identity salience on the discontinuity effect while either controlling (e.g., outcome interdependence) or excluding (e.g., intragroup discussion) alternative influences that were typically confounded with identity salience in the classical experimental paradigm on interindividual-intergroup discontinuity.

3.2 UNDERSTANDING THE IMPACT OF IDENTITY SALIENCE

3.2.1 Mediation analyses

Studies 2 and 3 were conducted to answer the following questions: How did persons in the social identity condition perceive the interaction situations compared to persons in the personal identity condition? What was the underlying motivation of persons with a salient social identity to defect more than persons with a salient personal identity? Inducing social identity salience with an artificial minimal group procedure (see Studies 1, 2, and 3) raises the question how mixed-motive game behavior was actually affected and what perceptions and motivations might be responsible for the detected behavioral difference in Study 1. Additionally, the robustness of the findings should be tested across other mixed-motive situations. Therefore, team members' perceived similarity to own and opponent team members (Study 2), and individual actors' perception of all participants as members of one group, members of two groups, and separate individuals (Study 3) were assessed. Moreover, Studies 2 and 3 used a prisoner's dilemma game (PDG), assessing cooperation/defection with a binary decision. Results of Study 2 showed, in line with the meta-contrast ratio (e.g., Turner et al., 1987), that team members perceived greater similarities to members of their own team than to members of the opponent team if those team memberships were assigned according to the minimal group procedure (social identity condition) than by chance (personal identity condition). In the same vein, individual actors categorized other participants more as members of two distinct groups in the social identity condition compared to the personal identity condition of Study 3. Thus, two different measures confirmed the effectiveness of the social identity manipulation. Furthermore, perceived relative similarity (Study 2) and perceived categorization as two groups (Study 3) mediated the effect of identity salience on mixed-motive game behavior, irrespective of

actors' outcome interdependence (Study 2: interdependent outcomes, Study 3: independent outcomes).

But what was the subjective motivation of persons with a salient social identity to defect more than persons with a salient personal identity? A salient social identity may give rise to a transformation of an actor's motivation (e.g., De Cremer & Van Vugt, 1999; Kelley & Thibaut, 1978). Therefore, several motivations that might affect mixed-motive game behavior were assessed in Study 2. Particularly the distinction between the two components of greed – the motivations to maximize absolute outcomes (max own) and relative outcomes (max rel) – might be crucial. Explanations of interindividual-intergroup discontinuity from the greed and fear perspective (Wildschut & Insko, 2007) have stated that *either* the motivation to selfishly maximize absolute outcomes *or* the motivation to competitively maximize relative outcomes should be increased in intergroup interactions compared to interindividual interactions. However, following the proposed identity-based perspective on interindividual-intergroup discontinuity, I assumed that the motivation to maximize relative outcomes rather than absolute outcomes should explain the effect of identity salience on mixed-motive game behavior, illustrating a competitive ingroup bias (e.g., Tajfel & Turner, 1979, 1986). Study 2 confirmed this expectation: The motivation to maximize the relative difference to the opponent(s) mediated the effect of identity salience on PDG-choice. This finding, of course, does not implicate that other motivations for defection in mixed-motive games, for instance maximizing absolute outcomes or the fear to become exploited, did not affect persons' behavior. Even in the personal identity condition of Studies 1, 2, and 3 about half of the participants chose to defect, indicating that other motivations were important as well, however, the difference to the (even more defective) social identity condition could be attributed to the competitive motivation to maximize relative outcomes only (Study 2). Also the findings of Study 1 indicated that both components of greed, max own *and* max rel, were important motivations for defective behavior in mixed-motive situations: Only when max own and max rel suggested the same kind of behavior like in the proposer role of the UG (i.e., small proposals), there was a significant main effect of identity salience. However, when max own and max rel suggested opposing kinds of behaviors like in the recipient role of the UG (i.e., max own: accept all offers, max rel: accept only offers > 50), there was no effect of identity salience. Put simply, only when max own and max rel "act in concert", max rel can make a difference. Given this theoretical and empirical analysis, I would speculate that

always when max rel is a mediating motivation of interindividual-intergroup discontinuity, identity processes should be at work. If, however, max own is mediating behavioral differences, other mechanisms should be responsible.

One should note that participants' motivations were assessed *after* they had made their PDG-choices. Therefore, associations between proposed mediators and choices might reflect a causal direction of choice on mediator instead of the (proposed) reverse. However, the statements regarding the reason for choosing to cooperate or to defect were clearly phrased retrospective as potential causes for participants' choice. Additionally, I had theory-grounded hypotheses about specific mediational coherences and "competing" mediators were tested against each other in the same analytical model. With this, I gained information of mediating variables but also variables that failed to fulfill the statistical criteria of mediation at the same time (see also Insko et al., 2001; Wildschut et al., 2002). Because of this conservative procedure, I am confident about the results' validity.

In sum, mediation analyses provided strong support for the assumption that mere identity salience may be sufficient to account for the interindividual-intergroup discontinuity effect.

3.2.2 Outlook

Although not tested directly yet, the emergence of an interindividual-intergroup discontinuity effect on the basis of mere identity salience has been doubted so far (Drigotas et al., 1998; Insko & Schopler, 1987; Insko et al., 1992). The criticism was based on the fact that a boost of group members' self-esteem by means of positive distinctiveness may be a plausible explanation for intergroup competition per se, but is incomplete to explain why intergroup interactions are *more* defective than interindividual interaction in mixed-motive situations. Clearly, also individual opponents should receive positive bolstering self-esteem from being "better" than the opponent. So, how could the observed effect of identity salience on mixed-motive game behavior be explained?

As stated earlier (see subchapter 1.4.2), an alternative interpretation of ingroup bias in minimal group settings is the epistemic motivation to reduce subjective uncertainty through self-categorization (e.g., Hogg, 2000). Self-categorization reduces uncertainty because the social comparison process of ingroup and outgroup maintains

the distinctiveness of the ingroup (e.g., Hogg, 2001; Hogg & Mullin, 1999). Uncertainty reduction might play an important role in the context of discontinuity research because mixed-motive situations entail high insecurity about the opponents' actions, the appropriate own action, and the resulting outcomes (*social uncertainty*, Kramer, 2010). I found preliminary support for the uncertainty reduction model in the context of interindividual-intergroup discontinuity: Particularly actors who perceived high subjective uncertainty regarding the appropriate action in the mixed-motive game, categorized all participants more as members of two distinct social groups in the social identity condition, and in turn, showed more defective behavior, compared to participants who perceived less uncertainty. However, further research is required to investigate the role of actors' subjective uncertainty for the emergence of a mere effect of identity salience on mixed-motive game behavior. For instance, I suggest manipulating actors' subjective uncertainty before they engage in an interindividual or intergroup mixed-motive interaction.

3.3 THE ROLE OF IDENTITY SALIENCE IN THE CLASSICAL EXPERIMENTAL DESIGN

Using a new experimental paradigm, the mere effect of identity salience on mixed-motive game behavior could be disentangled from other factors. The main effect of identity salience indicating that there was less cooperation under social identity salience than under personal identity salience occurred robustly across different mixed-motive games and was mediated by the hypothesized mechanisms. However, one might still wonder how these findings relate to previous research on the interindividual-intergroup discontinuity effect. Obviously, the manipulation of social identity salience via a minimal group procedure is not present in the classical experimental discontinuity design. This procedure was used because it allowed disentangling identity-based and interdependence-based effects on mixed-motive game behavior, which have been confounded in previous research. I have argued that the mere framing of the interaction situation and, in addition, intragroup discussions might trigger social identity salience in the classical intergroup interaction condition. Furthermore, the fact that the motivation to maximize relative differences is an established mediator of the discontinuity effect provides indirect support for the assumption that identity processes were relevant for the emergence of previously detected discontinuity effects.

Study 4 tested the effect of identity-based processes on PDG-choices by using a random group assignment and including intragroup discussions prior to decision-making, similar to previous studies on interindividual-intergroup discontinuity. In contrast to previous research, however, it was controlled for the effects of interdependence-based processes and the rational insight that actors might gain through intragroup discussion (e.g., Bornstein & Yaniv, 1998). Findings supported the hypothesis that intragroup discussions are able to create actors' social identity salience, although the subsequent interactions were between individual actors and not between team actors. Notwithstanding that I find the assumption plausible that a discussion might give actors a better understanding of the decision-making situation, findings of Study 4 did not support this hypothesis. Actors did not decide more "rational" (i.e. more defective) after having an intragroup discussion. So, even if actors gained insight in the game's rational structure through intragroup discussion, they were at least not using this insight for their decision-making. This result is important with regard to the relevance of identity processes for the classical interindividual-intergroup discontinuity effect. In line with my theoretical and empirical analyzes, I argue that intragroup discussions provide a possible source for social identity salience in the intergroup interaction condition. Therefore, social identity salience is not only a sufficient factor to produce the interindividual-intergroup discontinuity effect but contributes also to the emergence of the classical discontinuity effect.

3.4 IMPLICATIONS AND OUTLOOK

According to the theoretical and empirical investigations of the present dissertation, the discontinuity effect is not restricted to interdependence-based groups but may also apply for identity-based groups. This supports the generality of interindividual-intergroup discontinuity: Previous research claimed that relations between group opponents are less cooperative compared to relations between individual opponents when there is a positive interdependence between members of each group. Expanding this view, the present work suggests that the mere perception of opponents as members of distinct social groups may lead to negative interactions (i.e., competitive behavior) even without objective interdependences between members of the same social group. This has important consequences and implications for research on interindividual-intergroup discontinuity.

Certainly, research on pre-conditions and psychological processes of the discontinuity effect is interested to find “possible ways of reducing the effect and promoting intergroup cooperation” (Wildschut & Insko, 2009). Previous approaches to reduce interindividual-intergroup discontinuity related to a transformation of the perception of opponents’ negatively interdependent outcomes. For instance, by encouraging opponents to think beyond the immediate (one-shot/single) interaction situation to the long-term consequences of their behavior may undermine the role of short-term interested greed. Research has found that when opponents expected multiple interactions (as compared to a single interaction only) the discontinuity effect was reduced by a decrease in intergroup defection (Schopler et al., 2001; Wolf et al., 2009). Similarly, when the outcomes associated with mutual defection decreased, intergroup cooperation increased (Wolf et al., 2008). Both approaches relate to a manipulation of actors’ negative outcome interdependence, either in the long-run by making defection less profitable over repeated interactions or in the short-run by structurally changing the interaction situation. From the perspective of an identity-based view on interindividual-intergroup discontinuity, changing actors’ identity salience might be another approach to decrease intergroup defection and therefore, to reduce the discontinuity effect. Following this idea, various strategies have been effectively used to enhance intergroup relations in laboratory settings, most prominently the models of *recategorization* and *decategorization* (e.g., Brewer & Miller, 1984; S. L. Gaertner et al., 1989; Wilder, 1978). The basic idea is that members of distinct social groups are induced to recategorize the aggregate of all individuals either as one superordinate group or as separate individuals who are not members of any particular social category. The difference between these two approaches is that by recategorization actors’ social identity remains salient but shifts from the (inter)group level to the collective level, whereas by decategorization actors’ self-identity transforms from the (inter)group level to the personal level. Both recategorization and decategorization has been shown to reduce ingroup bias, the former more effectively than the latter (S. L. Gaertner et al., 1989). In my view, the strategies of recategorization and decategorization could be applied to the experimental paradigm on interindividual-intergroup discontinuity and might provide an alternative way to decrease the discontinuity effect. Notwithstanding an unpublished pilot study reported by Insko and colleagues (2005) that failed to reduce the discontinuity effect using a recategorization procedure (but also confounded interdependence-based and identity-based processes), I would expect that a merely

identity-based discontinuity effect as found in the present Studies 1, 2, and 3, might be substantially reduced by recategorization or decategorization procedures. It might be a target for future research to answer if and to what extent those strategies can be applied to the reduction of identity-based interindividual-intergroup discontinuity.

3.5 RELATED LITERATURE

Whereas the distinction between interdependence-based and identity-based group formation and its differential effects on intergroup behavior has been neglected in the field of interindividual-intergroup discontinuity, it has been recognized in other areas of research on mixed-motive situations or applied contexts.

For instance, early research on public goods – the G cell in Bornstein’s (2003, 2008) taxonomy (see subchapter 1.2) – provided strong evidence that social identity processes (i.e., group solidarity, group identification) increase public good provisions, although the exact psychological processes remained unclear (e.g., Brown-Kruse & Hummels, 1993; Dawes, McTavish, J., & Shaklee, H., 1977). Research on team games – the G-G cell – showed that public good provisions also increase if the intragroup conflict is embedded in an intergroup conflict (for an overview see Bornstein, 2003). In a recent experiment, this “intergroup conflict – intragroup cooperation” effect could be attributed to actors’ increased social categorization through an anticipated intergroup conflict rather than to their common fate (Böhm & Steiger, 2010). In sum, there is a good deal of evidence that identity salience may affect actors’ behavior in mixed-motive situations, regardless of the structure of the conflict situation.

Moreover, it has recently been shown that actors’ identity salience may have important impact on interindividual negotiations (Demoulin & Teixeira, in press; Trötschel, Hüffmeier, & Loschelder, in press). Here, it has been found that interactions between individual opponents with a salient social identity (i.e., outgroup members) compared to opponents with a salient personal identity increased competitive perceptions, which resulted in reduced concession behavior, and consequently led to inferior negotiation outcomes. As opponents were always individual actors, this behavioral difference can be attributed to a mere effect of identity salience, providing support for an identity-based discontinuity effect in a rather applied context.

This thesis contributes nicely to this literature by expanding the research on identity salience effects in social decision-making also to the interindividual-intergroup discontinuity effect.

3.6 CONCLUSION

More than twenty years of research has shown that there is a behavioral discontinuity between intergroup interactions and interindividual interactions, the former typically being less cooperative than the latter. This effect has important consequences for real life situations and it appears to be a scientific challenge to examine its structural and psychological foundations. This dissertation contributes to the literature on interindividual-intergroup discontinuity by providing a new experimental paradigm for investigating its minimal conditions. With this, it was possible to disentangle the impact of actors' outcome interdependence (independent vs. interdependent) and actors' identity salience (personal vs. social identity) on the emergence of the discontinuity effect. Throughout the four studies presented in the present thesis, actors' salient personal vs. social identity consistently created behavioral differences in different mixed-motive situations. This implies that identity salience may be sufficient to create the interindividual-intergroup discontinuity effect. Thus, the discontinuity effect may apply to a wide range of situations that have not been examined previously (e.g., interactions between individual actors who identify with different social groups), offering a merely identity-based perspective on interindividual-intergroup discontinuity.

Lets come back to the metaphoric question posed in the title of this dissertation: When does the sheep become a wolf? Summing up the findings in an equally metaphoric manner: The sheep's mere representation of belonging to a specific flock leads to wolf-like behavior in interaction with sheep from other flocks, irrespective of whether its fate is independent or interdependent from other sheep of its own flock in this interaction.

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EHRENWÖRTLICHE ERKLÄRUNG

Hiermit erkläre ich, dass mir die Promotionsordnung der Fakultät für Sozial- und Verhaltenswissenschaften der Friedrich-Schiller-Universität Jena bekannt ist.

Ferner erkläre ich, dass ich die vorliegende Arbeit selbst und ohne unzulässige Hilfe Dritter angefertigt habe. Alle von mir benutzten Hilfsmittel, persönliche Mitteilungen und Quellen sind in der Arbeit angegeben.

Bei der Datenerhebung und technischen Umsetzung der Experimente haben mir Christina Botros, Christoph Göring, Maxi Nieber, Vivien Raffel, Caroline Reiter und Susanne Schwager in ihrer Funktion als studentische Hilfskräfte unterstützt. Weitere Personen waren an der inhaltlichen und materiellen Erstellung der Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die Hilfe eines Promotionsbetreuers in Anspruch genommen und Dritte haben weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die vorliegende Arbeit wurde weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt. Weder früher noch gegenwärtig habe ich an einer anderen Universität eine Dissertation eingereicht.

Ich versichere, dass ich nach bestem Wissen die reine Wahrheit gesagt habe und nichts verschwiegen habe.

Jena, 29.09.2010

Ort, Datum



Unterschrift